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Journal of Electricity

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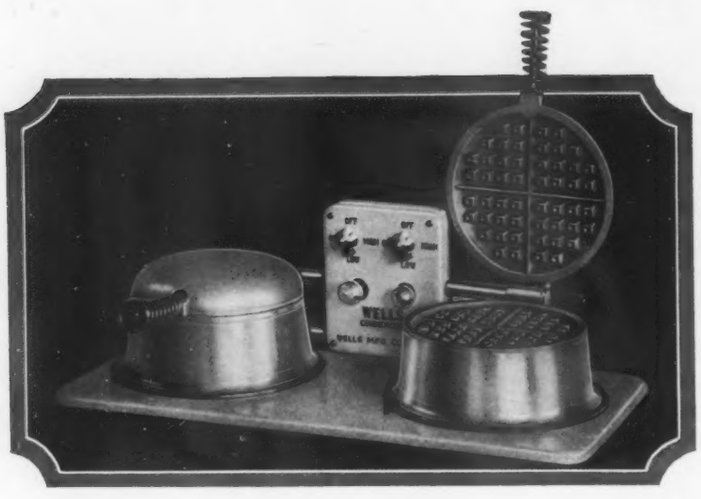

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Journal of Electricity entered as second class matter February 17, 1921, at the post office at San Francisco, under the Act of Congress, March 3, 1879.
Published the 1st and 15th of each month, at 883 Mission Street, San Francisco, California.

JUN 26 1924 © CI B619475

Journal of Electricity

A McGraw-Hill Publication
Published Semi-Monthly
Established 1887

C. T. HUTCHINSON, Acting Editor
G. C. TENNEY, Managing Editor

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VOLUME 52 | SAN FRANCISCO, JUNE 15, 1924 | NUMBER 12

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McGRAW-HILL COMPANY OF CALIFORNIA — 883 Mission St. — SAN FRANCISCO
PUBLISHERS OF Journal of Electricity

JAMES H. McGRAW, PRESIDENT
C. T. HUTCHINSON, VICE-PRES. & GEN. MGR.
C. M. LINDSAY, VICE-PRES. & TREAS.

WASHINGTON, Colorado Building
CHICAGO, Old Colony Building
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, $2.00 per year, 2 years $3.00. Elsewhere $3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Copyright, 1923
By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

McGRAW-HILL CO., Inc., New York
Publishers of
American Machinist—European Edition
(*Published in London*)
Electrical Retailing — Industrial Engineer
(*Published in Chicago*)
Chemical and Metallurgical Engineering
American Machinist — Ingenieria Internacional
Electrical World — Electric Railway Journal
Engineering and Mining Journal-Press
Bus Transportation — Engineering News-Record
Coal Age — Electrical Merchandising — Power

Announcing Our Northwest Office

IN line with the spirit of progress constituting a definite policy of the McGraw-Hill publications, the Journal of Electricity takes pleasure in announcing the opening of a branch office at Portland, Oregon, with Berkeley Snow in charge as Northwest editor.

Mr. Snow, whose career has been summarized in the personal columns in this issue, will devote his entire attention to the electrical industry in the Northwest, so that the industry may find in the Journal of Electricity to a greater degree than ever before a medium of expression that will faithfully interpret the progress and best thinking within that geographical section of the great West.

It is the aim and hope of the publishers that, through this extension of their editorial contact, a greater co-ordination of effort may be brought about between the many varied electrical interests in the Western states. With some seventeen hundred miles as the distance between the Mexican and Canadian lines, and a sparse population as compared to Eastern centers, it is vital that everybody within the electrical industry shall be informed at all times of the progress of his co-workers, so that he may benefit thereby.

In undertaking this added service the Journal of Electricity feels sure the industry in the south as well as those who are blazing the trail of progress in the Pacific Northwest will benefit thereby. The Journal of Electricity looks forward with confidence to a greater usefulness than ever before, and bespeaks for Mr. Snow the cooperation of its many friends in the Northwest.

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A Nation of Investors

SEVEN hundred million dollars a year is the amount spent by the American public for fraudulent securities, according to an estimate made by the Better Business Bureau of the Associated Advertising Clubs of the World. Bucket shops, the mails, slick salesmen and wily solicitors each year unload enough Gougem Coal Company 6's, Curious Copper Preferred, Greezo Oil Common and Alaska Codfish Bank 15's upon the unsuspecting public to pay the interest for ten months on all of the billions of Liberty Bonds outstanding. Despite the utmost vigilance of Uncle Sam's agents this gouging continues and, in fact, grows.

COMPARE this with the sum subscribed by the American public to the gas and electric utility companies of the country in 1923. Three hundred millions of the savings of hundreds of thousands of thrifty families was invested in securities of the highest class, securities which are accepted as legal investments for savings banks and which are among the largest holdings of the insurance companies of the country. Ten years of development of the customer-ownership idea is responsible for this achievement.

WE feel positive that were it not for customer-ownership a part, if not all, of the money invested by the public in the securities of the public utility companies which furnish them service would have gone the way of the seven hundred millions which disappeared like water in a squirrel hole.

FROM the standpoint of the central stations customer-ownership is selfish. They are able, through the disposal of their common and preferred stock to the public, to raise a portion of their construction funds. In addition to sounder financing, they gain the friendly interest of a large and influential group of citizens in the communities which they serve. In other words, their public relations is greatly improved. This self-interest in the customer-ownership idea has had a tendency to overshadow some of the broader aspects of the problem. The public utilities must not overlook the public.

NO matter what the gain to the companies, in the final analysis the public itself is the greatest gainer. It is inherent for the American to own something, i.e., to invest. In providing the means for an easy and safe investment, the power companies have performed a great and lasting service. They are transforming the country into a nation of investors and in so doing they are helping to make a more contented and more prosperous people.

Superpower Again Takes the Stage

SUPERPOWER again makes its appearance in print, this time from a slightly different angle and with a new suggestion for its development. A bulletin entitled, "Hydroelectric Power in Washington, Part 1, A Reconnaissance Survey," by Carl Edward Magnusson, professor of electrical engineering of the University of Washington, has recently been published by the university, and is reviewed in another section of this issue.

The bulletin contains considerable material of interest to the student of power development possibilities in that state, as well as much food for thought for those interested in seeing a superpower program of development economically and efficiently consummated. It is generally conceded that here in the West is found a semblance of a superpower system. It is perhaps also generally conceded that the system is yet incomplete and far from perfect. Professor Magnusson subscribes to these views in general, but indulges in stronger language as follows: "The present interconnecting practice is merely a step in the right direction, a temporary makeshift by which comparatively small advantages may be gained." We cannot agree that the advantages that will accrue to the people of the three Pacific Coast states during the impending season of drouth, by reason of our interconnected power systems, will be "comparatively small." We must contend that the advantages have been great and will continue to be greater as the normal development of our superpower systems of the West progresses.

But we do not intend in this comment to treat Professor Magnusson's bulletin critically. We recognize in it a valuable contribution to the complete knowledge and understanding of the superpower possibilities of the country, and we recommend its perusal to all that would view the problem in a large way. He unquestionably has sounded the keynote of the principal difficulty that will have to be surmounted before a perfected operating system is possible when he says, "Fundamental questions of ownership and control, regulation and management, and in fact most of the complex administrative and legal problems of public utilities, require new interpretations and call for solutions consistent with the imposed conditions." Further, there is a prophetic ring to the following significant utterance: "In the creation of superpower systems for any extensive region, as the State of Washington, the Pacific Coast or the Atlantic Seaboard, it may be found desirable to consider a new cleavage and to provide a separate organization for each field of industrial activity; manufacturing, transportation and retailing of electric energy." These statements will undoubtedly furnish the basis for some thought by public utility officials.

His suggestion, however, for federal ownership of the transportation phase of the business we believe no more necessary nor advisable than federal ownership of railroads. "Common carrier principles," as applied to the regulation of railroads, can be applied to trunk transmission lines as readily without government ownership as with it; and it will perhaps not be necessary to delve again into the government ownership controversy to support such a statement.

His recommendation, "That a State Power Commission be created, . . . empowered to conduct comprehensive engineering power surveys of all the streams in the state, etc.," might well be expanded to include the surrounding states as well. Without attempting to minimize the importance, in a superpower system, of the State of Washington within the boundaries of which is enclosed sixteen per cent of all the available water powers of the United States, it must be recognized that superpower development should be guided by economic influences rather than political and geographic ones, and cannot be perfected without utilizing the power of the other four Western states that, with Washington, contain over sixty per cent of the country's potential hydroelectric power.

Electricity in the Architect's Home

"ELECTRICAL homes for electrical men" reads the slogan, the theory being, of course, that the man who uses electrical equipment himself will be able to urge its use by others more sincerely and more convincingly. A similar slogan might be a very useful one in connection with the electrical education of the architect. Much has been said in the past of the necessity of convincing the architect of the advisability of installing electrical conveniences in the modern home—articles have been written for architectural magazines, addresses have been made before architectural gatherings and calls have been made upon the individual men in their offices. But the architect is rightly a conservative. He hesitates to recommend to his client anything which he regards as still in the experimental stage, however great its advantages—and in consequence often omits electric refrigeration, cooking equipment and air heating in homes which could well afford the comfort and cleanliness of these conveniences. Why not try reaching the architect in his own home? If his own house is provided with an electric ice machine and he has the testimony of his wife in regard to its success and economy, he will have the confidence of knowledge in recommending it to others. The electrical industry might well consider ways and means of facilitating the purchase and installation of electrical equipment by the architectural profession. Why not the slogan, "Modern homes (which means, of course, electrical homes) for architects"?

Lighting and Heating Schools for the West

NATIONAL schools for teaching industrial heating practice and sales methods, as also schools in illumination and other commercial fields of power company enterprise, have been conducted annually for some time under the auspices of the National Electric Light Association. A few representatives from the Pacific Coast have taken the opportunity thus offered and have attended these schools. But the expense

involved is proportionately high as compared with other sections of the country—and not many companies have felt that they could afford to send their employees so far. There are, moreover, specific Western problems consequent upon the difference in climate and in the nature of the industrial development in this district which cannot be fully met by a national group. In consequence, the tendency has grown up to establish Western schools to cover these respective fields. This has already been done locally in the case of lighting schools—and a recommendation has been made by a committee of the Pacific Coast Electrical Association to open a school in air heating for California. Hardly less urgent than these two fields is that of industrial heating which will undoubtedly make its own demand soon for local instruction. The day has passed when one school or university can meet the national needs for academic training—and it is high time that the West developed a system of schooling to meet its own needs in commercial and vocational fields.

Are We Suffering from the Hoof and Mouth Disease?

WHEREVER men gather there is heard the question, "How is business?" Normally the answer is "Good," but of late we have heard many pessimistic replies. Certain information that has been imparted to us and an investigation of actual conditions reveal that there is no ground for concern in the present situation. Quite to the contrary, the general report is of a larger volume of buying than during the same period of last year. The class of merchandise bought may differ but the gross sales are greater and the material sold all shows a profit. In addition, the character of this year's business seems to be firmer and less speculative than for some time past and the development, therefore, seems healthier. Expressions of foreboding are apparently untimely and can have but one reaction—a disadvantageous one. Business is sensitive to treatment and often trembles at rumor. A practical application of the old Roman maxim "Nihil nisi bonum" would react in greater general confidence and less conservative buying. Continued unfavorable comments will show that even humans may suffer from the hoof and mouth disease, and that they can turn their feet away from business and talk themselves into an unpleasant situation.

Westinghouse Celebrates Forty Years of Service to Industry

FORTY years is not a long time, yet, in the period between 1884 and 1924, the strides taken by industry have been greater than for any similar period recorded by mankind. Then the telephone was only eight years old; the arc lamp was sputtering fitfully on a few streets of our larger cities; Thomas A. Edison was just about ready to introduce his incandescent lamp into the homes, and the central station was coming into being.

George Westinghouse, then thirty-eight years old and with his famous air brake fifteen years in the service of the railroads, turned his energies toward the development of the electrical industry. To the Westinghouse Machine Company, then four years old, he added the Interlocking Switch & Signal Company, and merged it into the Union Switch & Signal Company. His next step was the organization of the Westinghouse Electric & Manufacturing Company, in conjunction with William Stanley, to engage in the manufacture of a self-regulating dynamo for lighting service.

It is a far cry from the small beginning of forty years ago, to the great manufacturing establishments that bear the Westinghouse name today. Their accomplishments would fill volumes. There are the alternating-current system for the generation, transmission, transformation and application of electricity; the alternating-current meter, non-arcing lightning arrester, step-type regulator, induction motor, the lighting of the World's Exposition at Chicago in 1893, the harnessing of Niagara Falls for the generation of electricity, the introduction into America of the steam turbine, and countless other contributions to the wealth and comfort of the people.

Our congratulations are heartily extended to the Westinghouse company, in the feeling that its record of achievement in the past is the best prediction for an even greater future.

Crackers and Conventions

THE convention idea is growing. This is particularly true of the electrical industry, which has been satirically described as a body of men entirely surrounded by conventions. Every once in a while executives wonder, especially at the time when expense accounts pile up on the auditor's desk, whether it is really worth while, whether the amount of constructive good resulting from the annual, semi-annual or quarterly meetings is sufficient to justify the cost in time and money.

Perhaps the first conventions took place at the crossroads store in the days when the United States was industrially very young indeed. They were informal and voluntary. With the assistance of a plug of tobacco and an open box of crackers involuntarily contributed by the storekeeper, the affairs of the national as well as local gossip were discussed ad infinitum. It is a far cry from then to now, but the principle of the thing is precisely the same. There is no more humanizing influence than contact with one's fellow man, and the interchange of ideas on subjects of mutual interest.

Nevertheless, it is well to sound a note of caution, lest the box of crackers be permitted to constitute the chief interest. Play is an excellent thing, in its place, and a trip to some attractive resort is undoubtedly delightful, especially when it is made possible by the liberality of employers. Those who are privileged to attend conventions should not forget that, in doing so, they have accepted an obligation which they are in honor bound to discharge by conscientious attention to the serious side, that they may be better equipped to fill their positions to their own and their employers' advantage. All play and no work makes Jack a poor boy.

CURRENT COMMENT

Water and Power Act Draws Fire From Rural Press

Early developments indicate that the proposed $500,000,000 California Water and Power Act will play a much more prominent part in the press of the state in 1924 than it did in 1922. Moreover, the discussions this year will be more sound for they will be based upon the experience gained during the campaign two years ago. As an indication of what may be expected, especially from the papers of the rural districts, the following quotation from an issue of the Saratoga (Calif.) Star is offered:

Once again the Galahads of Public Ownership are to assail the naughty public service corporations with a new Water and Power Act. This time they expect to win, not alone because their heart is pure but because they intend to do some advertising on a large scale to offset advertising by the power companies and their friends. The publisher of the Star had a very pleasant talk with a representative of the forces behind the new Water and Power Act. We liked him. He was courteous, idealistic in a practical sort of way, and, we were most grateful to note, he did not accuse the press of California of being bribed in the last campaign. Public ownership advocates frequently have a tendency to accuse those who disagree with them of being knaves or fools.

We told him frankly that we could not agree with him, and that we believed a paper has the right to have a clearly defined editorial policy. We stated, however, that the Star, while cheerfully accepting all advertising, has an independent news and editorial policy, and that during the campaign, as a proof of this fact, the Star will run a column each week of bulletins or other campaign matter prepared by the Water and Power Act headquarters, irrespective of whether this paper received any of their advertising or not. No one can ask more than that. The only stipulation is that this matter is to show its source.

The objections to public ownership are so many and so important that it is difficult to deal concisely with the subject. Under present conditions, public ownership means control by a minority of the public. You cannot get every citizen to register. As a rule, not more than fifty per cent of those who take the trouble to register vote at an election. Thus a very small minority of voters frequently decides important matters, and the public ownership advocates, we believe, would have a stronger case if they would devise and demonstrate some way of making the "voters" vote.

Furthermore, the usual motive of voting, it is hardly cynical to say, is some variation of the classic phrase "Let's kick the rascals out."

A public service corporation has to pay dividends, and for that reason its executives are chosen primarily for their efficiency. How the public could select executives for technical ability instead of judging them only by their agreeableness as politicians is a conundrum we cannot answer. Furthermore, the lesser employees of a public service corporation usually do their work or are discharged. In this problem, the state has to choose between the old spoils system or the civil service "merit" system, and the latter is preferable to the spoils system. It however usually means that an employee cannot be discharged for inefficiency or laziness, because such a discharge is attended with so much red tape about hearings, etc., that the department head merely tolerates an inefficient employee and hopes for better luck when he draws another assistant.

A week or so ago, we read the letter of resignation of Will J. French from the Industrial Accident Commission. It was too long to print, but it indicated that Mr. French, the last of the original board of commissioners, resigned because recent appointments and policies were dictated by politics rather than considerations of efficiency. Now the Industrial Accident Commission was so well conceived and so ably administered that it was a model not only for other states but for other nations. If it could not be kept free from politics, no body ever can. This commission does work that must be performed by the state. The Star believes that the Industrial Accident Commission, the Railroad Commission, the Highway Commission, and the other bodies doing work which cannot be performed by private agencies are about as big a mouthful as the state can masticate in this generation. We believe that sooner or later placing power and water interests under the state would be to the detriment of the public, until a more efficient state government is achieved.

The Star sees no moral question involved in this issue. We do not believe that any body of men or corporations has a "vested interest" in public utilities. We do believe, however, that power interests in this state are better administered than they would be under public ownership. We think there is fairly conclusive evidence of this in the fact that the use of electricity is more general in this state than in other commonwealths. We believe in public supervision of corporations, but we do not believe in throttling them, and we think that in the present state of evolution of the American national commonwealth the public service corporation is the best method of handling its functions, if the corporation is run with average ability and honesty. If the corporation is bad, public ownership is preferable.

Of course, efficient public management is not impossible, but it is so improbable that continuous efficient management by the state is to all intents and purposes only a theory. Los Angeles and her Owens River project are frequently cited as proof of the practicability of public ownership. This project ever since its inception has been under the one-man control, we believe, of an exceedingly able engineer. His retention for that length of time in that position is a miracle of American politics in a political unit not otherwise noted for statesmanlike sagacity or purity of administration. To hope for a similar miracle by the state is taking too much of a gambler's chance.

DISCUSSION

Motives of Journal of Electricity in Opposing Municipal Ownership Questioned

No feature published in the Journal of Electricity has elicited wider comment than the interview on municipal ownership with Ole Hanson, former mayor of Seattle. The article was reprinted in full in many of the newspapers and periodicals of the Pacific Coast states and was also the subject of considerable editorial comment. The interpretation placed upon the interview depended to a large extent upon the leanings of the particular journal in which it was used. There is one case which we feel should be called to the attention of our readers. The following quotation is taken from the Seattle (Wash.) Union Record of April 23, 1924:

"Ole Hanson, who, as mayor of Seattle, tricked the people into buying a $7,500,000 street car line for $15,000,000, has decided that he is no longer in favor of municipal ownership. This is disclosed by an interview with Hanson, entitled 'Why I Do Not Believe in Municipal Ownership,' appearing in the current issue of the Journal of Electricity, a semi-monthly magazine published by the private power interests of Los Angeles."

In an effort to clarify the obvious misstatement in the above paragraph the following letter was sent to the publisher of the Seattle paper:

May 16, 1924.

Publisher,
Seattle Union Record,
Seattle, Wash.

Dear Sir:

Our attention has been called to a story appearing in the columns of your paper under date of April 23, 1924.

In the first paragraph the statement is made that the Journal of Electricity "is a semi-monthly magazine published by the private power interests in Los Angeles." If the material appearing on other pages of your paper is as glaringly inaccurate as the above statement we wonder how you are able to hold your subscribers.

In the first place, the Journal of Electricity is an independent publication published by the McGraw-Hill Company of California, a subsidiary of the McGraw-Hill Company, Inc., of New York, one of the largest publishers of technical books and magazines in the world. We have no affiliations with either the electrical industry or any other industry to which our magazines cater. We are opposed to government or municipal ownership of private business because we feel that it is at variance with the ideas and ideals of the American people.

We should be glad if you will be kind enough to retract the statement made in the news item referred to above.

Yours very truly,
GEORGE C. TENNEY,
Managing Editor.

In answer to the above the following letter was received from the Union Record:

May 19th, 1924.

Mr. G. C. Tenney,
Journal of Electricity,
883 Mission St.,
San Francisco, California.

Dear Sir:

Your letter pointing out our error with respect to the Journal of Electricity will be published on the editorial page of the Union Record. We regret very much that this error was permitted to creep into the paper. The article in which it occurs was not written by a member of the staff but was contributed by a well known local engineer.

If similar errors have never found their way into your publication then you are indeed the most fortunate editor in the country. Your insinuation that other articles are in error because you found a single mistake in one article is indicative of a lack of restraint unworthy of reply. You say that you are opposed to government or municipal ownership because you feel that it is at variance with the ideas and ideals of the American people. We feel that you have misinterpreted the ideas and ideals of the American people, even if we are willing to take at face value your statement that you are not influenced by any large advertising receipts you obtain from the interests you defend.

Accept again our sincere regrets for the unfortunate mistake in the Union Record which we shall hasten to correct.

Yours very truly,
SEATTLE UNION RECORD,
SAUL HAAS,
Managing Editor.

The above letter challenges the statement that the Journal of Electricity is an independent publication with the inference that its policies are influenced by the advertising revenue it receives from the interests it defends. An analysis of the advertising receipts for the year 1923 shows that the total revenue from advertising placed by the privately owned electric utilities operating in the eleven Western states was but $1,757 or but $35 per company if all fifty had used space. This $1,757 is 1.45 per cent of the total revenue derived from advertising during that year.

In 1922, the year of the campaign for the California Water and Power Act, a measure which was opposed by the Journal of Electricity, the advertising revenue received from the power companies was $3,280 or 2.7 per cent of the total advertising receipts for the year.

These figures show the absurdity of the inference made by our contemporary in the North. It is not wise to impute motives without some basis of fact.

THE EDITORS.

Engineer Explains Reason for Choosing Route of Los Angeles Aqueduct

To the Editor:

Sir: In your issue of the 15th inst., you state editorially that the Los Angeles aqueduct was built on a flatter grade than necessary at an extra expense of several million dollars, in the upper portion of the canal, in order to increase and concentrate the fall for hydroelectric development near the city. This was done, you say, to assist the subsidiary Bureau of Power and Light at the expense of the main project.

The facts in the case are these. The aqueduct had two possible points to pierce the Sierra Madre range, one near Acton into the head of the Soledad canyon, and the other under Elizabeth Lake into the head of the San Francisquito canyon. The first line would have crossed the Antelope Valley near the line of the Southern Pacific Railroad. This would have been a shorter route than the other, but would have required a long syphon with considerable head. The westerly route—the one selected—skirted the north side of Antelope Valley until it reached a point where a short syphon with a low head put it across the valley, whence the canal led to the portal of the Elizabeth Lake tunnel. This tunnel is five miles long, and is the longest single tunnel on the aqueduct system.

If the aqueduct had been built on the steeper grade that you suggest, the cross-section would have been smaller, and the canal distance less, with a consequent saving in cost on this part of the project. But the tunnel under the Sierra Madres, would have been longer than the one that was built, and could have been made fifteen miles long by your method of construction. It was purely a question of balancing tunnel costs against open canal—a longer canal meant a shorter tunnel.

The present alignment of the aqueduct was the most economical location for the building of the water way, regardless of the fact that it did improve the power possibilities incidental to the project.

I am sure that your readers, who are most of them engineers, would have more respect for your editorial opinions, if you were careful to ascertain the facts before expressing an opinion.

GEO. R. SHUEY,
Assistant Engineer, Department of Public Service, City of Los Angeles.

Independence, Calif.
May 20, 1924.

NOTABLE progress has been made in the customer-ownership drive in the ten years that Western utilities have been fostering this movement. The utilities have secured success by courteous treatment of all customer-owners and by careful attention to details. Illustrations show the care taken by the Southern California Edison Company in filling out stock certificates and by the Pacific Gas and Electric Company in mailing dividends.

Development of Public Investment in Privately Owned Utilities

By George C. Tenney
Managing Editor, Journal of Electricity

CUSTOMER OWNERSHIP as developed by the gas and electric utilities of the country has made great strides during the past few years. Originated in the West, its progress has been more marked among western utilities than those of any other section of the country. In 1923 the electric companies of the Pacific Coast states increased the number of their stockholders 30 per cent. This article reviews the progress which has been made.

CUSTOMER ownership needs little or no introduction. Originated ten years ago by the Pacific Gas and Electric Company, it has been adopted by most of the leading utilities of the country. It is estimated that today the light and power industry of the United States is owned by no less than two million investors and that 600,000 of these own securities in the companies which furnish them service. Conservative estimates place the amount of new capital raised through customer ownership activities during 1923 by the light and power companies for construction and extension purposes at $300,000,000. In many cases utilities have been able to raise 75 per cent of the money required for such purposes through the sale of junior securities to the public and have had to depend upon the sale of bonds for but 25 per cent of the capital necessary to keep pace with the growth of the territory served. Judged in the light of past growth the time is not far distant when the ownership of the light and power industry will pass into the hands of the public through the universal ownership of securities in the enterprises which make up this industry. The prediction has been made that within the next ten years the number of customer owners will have passed the five million mark.

Much has been said and written regarding the benefits that accrue both to the public and to the utilities through the widespread distribution of securities among customers. It is obvious, however, that a plan of this kind which enables public service companies to raise a considerable portion of the capital necessary for construction through the sale of stock, and at the same time to secure the favorable interest of a large and representative class of people should commend itself to the utility companies. That the program is both sound and successful is demonstrated by the number of companies in the light and power industry which have adopted the plan and in the widespread interest that is being shown in it by industries outside the field of the utilities.

From the standpoint of the public at large customer ownership has many obvious advantages. Babson's Report recently commented on this phase of the subject as follows:

"Fitting into this situation, from the standpoint of the investor, is the fact that customer ownership offers a safe investment opportunity for the man of moderate income who can lay aside only a small amount each month. An important reason why fraudulent investment schemes and bucket shops have flourished since the war is that the conservative investment house as a rule is not organized or equipped to serve the person of small means who has no money to invest except out of current income. The cost of handling such accounts is too high to make it profitable.

"Hence, the sale of preferred stock under customer ownership plans by public utilities is a protection to the inexperienced and small investor who desires to own securities. While fundamental economics would urge the savings banks as the most suitable depository for the money of the man of small means yet the fact remains that the desire to invest is so deep rooted that there will always be a certain percentage of men and women who will insist on investing rather than saving it. It is, therefore, in the interests of such persons that customer ownership functions. It offers securities purchasable in small amounts in an enterprise which the investor knows something about. As an asset to the company, customer ownership increases good will of the company because of the presence among the stockholders of a large number of local investors whose friendly influence will extend through the community served by the company."

It is appropriate enough that in the West where the idea originated, customer ownership has made the greatest strides. Of the 50 major privately owned electric utilities operating in the eleven Western states, 25 have undertaken customer ownership programs. Nor have the activities been confined to the larger companies alone. Some of the smaller utilities have been among the most enterprising in this work.

A survey of customer-ownership activities of these companies during 1923 which has just been completed by the Journal of Electricity shows that on Jan. 1, 1924, the 3,215,516 shares outstanding of the twenty-five companies actively engaged in selling

Customer-Ownership Progress Among Western Utilities in 1923

NAME OF COMPANY	Headquarters	Territory Served	Population Served	No. of Consumers (Electric Only)	Total Shares Outstanding Jan. 1, 1924	Total Shareholders Jan. 1, 1924	Total Shares Outstanding Jan. 1, 1923	Total Shareholders Jan. 1, 1923	Total Consumer Shareholders Jan. 1, 1924	Total No. Employees	Total Employee Shareholders	Total Shares Owned by Employees	Total No. Shareholders Owning 10 Shares or Less
The California-Oregon Power Co.	Medford, Ore.	Calif.-Ore.	50,000	13,576	33,706	1,662	29,388	1,228	1,251	204	138	1,026	1,325
Coast Counties Gas & Electric Co.	Santa Cruz, Calif.	Calif.	20,000	5,565	8,559	1,911	3,866	880	1,806	157	32	815	422
Coast Valleys Gas & Electric Co.	Salinas, Calif.	Calif.	25,000	6,966	34,838	186	34,423	106	66	120	45	495	110
Deschutes Power Co.	Spokane, Wash.	Oregon	2,500	965	3,000	53	2,944	53	12	13	2	8	28
Dixie Power Co.	St. George, Utah	Utah	11,000	1,429	2,263	210	2,252	209	200	20	6	276	190
Enterprise Electric Company	Spokane, Wash.	Oregon	3,500	1,219	2,390	61	2,314	61	12	10	5	31	39
Grangeville Electric Light & Power Co.	Spokane, Wash.	Idaho	600,000	1,302	4,340	159	4,053	151	13	14	4	4	79
Great Western Power Co.	San Francisco	California	1,000,000	45,833	70,240	4,556	60,213	3,575	*	1,047	*	*	*
Idaho Power Company	Boise, Ida.	Idaho	150,000	40,161	32,910	2,303	13,100	659	1,153	577	122	762	*
Los Angeles Gas & Electric Corp.	Los Angeles	California	840,000	85,370	69,917	3,754	57,902	3,027	*	3,950	200	1,100	2,470
Natrona Power Company	Casper, Wyo.	Wyoming	15,000	6,194	703,629†	40	601,577†	37	*	75	3	36,347†	*
Northwestern Electric Co.	Portland, Ore.	Ore.-Wash.	275,000	17,916	131,724	2,301	126,616	1,615	750	250	210	600	1,569
Pacific Gas and Electric Co.	San Francisco	California	1,800,000	335,955	898,756	27,013	858,993	25,890	*	9,993	1,690	19,637	14,643
Pacific Power & Light Co.	Portland, Ore.	Ore.-Wash.	140,000	34,618	46,876	2,779	43,261	1,680	1,449	597	255	879	2,100
Portland Electric Power Co.	Portland, Ore.	Ore.-Wash.	330,000	69,004	260,260	4,425	233,752	2,283	*	3,183	*	3,125	*
Public Service Co. of Colorado	Denver, Colo.	Colorado	420,000	79,537	29,933	6,347	16,384	668	5,510	1,513	551	972	5,804
Puget Sound Power & Light Co.	Seattle, Wash.	Wash.-Ore.	390,000	80,723	431,900	8,165	406,190	*	*	2,400	870	3,096	1,215
San Diego Consolidated Gas & Electric Co.	San Diego, Calif.	California	150,000	39,478	51,254	2,653	41,256	2,150	1,870	1,027	127	1,258	1,656
San Joaquin Light & Power Corp.	Fresno, Calif.	California	350,000	55,465	257,519	10,440	245,194	4,387	3,769	1,429	1,300	2,733	7,298
Southern California Edison Co.	Los Angeles, Calif.	California	1,500,000	229,404	576,247	65,636	516,247	48,107	55,000	5,300	4,126	70,176	*
Southern Colorado Power Company	Pueblo, Colo.	Colorado	200,000	19,369	23,250	1,752	20,828	1,281	1,752	377	45	309	1,311
Utah Power & Light Co.	Salt Lake City, Utah	Idaho-Utah	340,000	77,954	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Washington Water Power Co.	Spokane, Wash.	Washington	150,000	43,830	201,804	2,874	177,791	2,153	*	719	91	1,225	1,282
Western States Gas & Electric Co.	Stockton, Calif.	California	100,000	34,020	34,480	1,084	31,480	951	813	360	130	632	796
Wood River Power Co.	Hailey, Ida.	Idaho	2,500	750	2,316	21	1,689	20	9	11	4	78	10
				1,326,603	3,215,516(b)	150,385	2,936,151(b)	101,171		33,346	9,955	109,600(b)	

*No Record.

†–$1 par value.

(a) No report received.

(b) In these totals stock of Natrona Power Company having $1 par value was included as units of 100 shares each to conform with stocks of other companies which have $100 par value.

Save $5
per month
Earn 7.14%
from
COPCO
preferred
THE CALIFORNIA OREGON POWER COMPANY
$5 a Month
Makes You
Our Partner
EARN 7 PER CENT
WHILE YOU PAY
The Washington
Water Power Co.
THE
ASSOCIATED
GROWER
Volume 6 JANUARY, 1924 Number 1
PRESIDENT COOLIDGE SAYS:
"He (the farmer) must have organization.
"His customer with whom he exchanges products of the farm for those of industry, is organized.
"Labor is organized, business is organized.
"And There is No Way for agriculture to meet this unless it, too, is organized."
In his message to Congress delivered Dec. 6, 1923.
A Magazine for the Raisin, Peach and Fig Growers of California
LOOK IN YOUR
SAFETY DEPOSIT BOX
If You Have Not Any
EDISON 7% PREFERRED STOCK
Why Not Purchase Some
And diversify your securities with one of the highest grade stocks in America?
Write or call for our illustrated
ANNUAL REPORT
Price: $105.00 per share cash, or $105.00 at $5.00 per share per month
SOUTHERN CALIFORNIA
EDISON COMPANY
ANNOUNCEMENT
The California Oregon Power Company wishes to announce the offering of a block of its seven per cent preferred capital stock, which is to be sold at ninety-two dollars per share, to realize seven and six-tenths per cent on the investment.
This stock will be sold for cash or on special savings plan.
Further details may be had at any of our offices or from employees of the company.
THE CALIFORNIA OREGON POWER COMPANY
Babson
says—
COPCO
preferred
put more
power
behind
your
dollars
Puget Sound Power & Light Company
"Economy is one of the highest virtues. It begins with Saving Money"
—A. Lincoln
PREFERRED STOCK
PACIFIC POWER & LIGHT COMPANY
Pacific Gas and Electric Company
The Foundations of Credit—Earnings and Assets
What Ten Dollars
Will Do--
$10.00 spent for a dinner lasts ten hours.
$10.00 spent for a hat lasts ten weeks.
$10.00 spent for a suit lasts ten months.
$10.00 spent on our 7% Prior Preference Stock outlasts a lifetime, because this Company's service will always be necessary to the progress and comfort of the nearly forty communities served by it.
Portland Railway, Light
& Power Company
Shares are $98.00, to Yield 7.14%

The newspaper advertisements reproduced above are used in daily newspapers and monthly periodicals to further interest in the customer-ownership campaigns of Western power companies. The larger center illustration is a poster used by the Pacific Power & Light Company.

to the public were owned by 150,385 stockholders. An idea of the growth of the movement can be gained from the figures for the preceding year. On Jan. 1, 1923, these same companies had outstanding 2,936,151 shares which were owned by 101,171 stockholders. Thus 279,365 shares of stock were sold to 49,214 new stockholders during the year 1923.

From the accompanying table, it will be noted that some of the companies showed remarkable growth for the year. The Coast Counties Gas & Electric Company, the Idaho Power Company, the Pacific Power & Light Company, the Portland Electric Power Company (formerly Portland Railway, Light & Power Company), the Public Service Company of Colorado, the Puget Sound Power & Light Company, the San Joaquin Light & Power Corporation, and the Southern California Edison Company were among the leaders. The position of the last named utility is worthy of particular note. At the time the survey was made its stock was owned by 65,636 stockholders of whom 55,000 were consumers. No company in the United States can approach this record.

The table also shows that considerable progress has been made in the distribution of stock among employees. Out of a total of 33,346 employees in these twenty-five companies 9,955 own 109,600 shares of stock. Sixty-seven and one-half per cent of the employees of The California Oregon Power Company are stockholders in the company; 84 per cent of the employees of the Northwestern Electric Company own stock; 91 per cent of the employees own stock in the San Joaquin Light & Power Corporation and 78 per cent of the employees of the Southern California Edison Company receive dividends from company securities.

The survey showed that two distinct methods are employed in selling stock to the public. In approximately half of the cases all stock is sold by employees in connection with their regular duties. A small commission is paid on stock sold. From the reports received this method has proved very effective. The remainder of the companies maintain a separate stock sales department with manager and salesmen. In some cases the sale is confined entirely to these men while in others employees work in conjunction with the stock sales department. Salesmen work on a straight salary or a salary and commission basis.

An idea of the sales methods can be gained from the following account of the procedure followed by the various individual companies:

The California Oregon Power Company.—Stock is sold by employees and by a direct-by-mail campaign supervised by the secretary of the company. Liberal use is made of newspaper advertising and stock literature is sent out from time to time. A flat commission of $1 per share is paid to employees.

Coast Counties Gas & Electric Company.—Direct solicitation of consumers by employees is the procedure employed by this company. Considerable space is used in the newspapers of the territory served. A special prize of $10 is paid each month to the member of each district securing the largest number of new stockholders (minimum, five new subscribers). No commission is paid to officers of the company or to district managers. Employees are paid $1 per share for the first five shares to any one subscriber and 25 cents per share for all over five. In addition $2 is paid for each new subscriber obtained regardless of the number of shares sold.

Coast Valleys Gas & Electric Company.—This company does not conduct any intensive campaigns. Most of its stock has been sold by a salesman employed for that purpose. All of the local papers are used for stock sales advertising. Stock bulletins are also mailed out to stockholders and consumers from time to time. A flat commission of $1 per share is paid to employees selling stock and to the salesman.

Dixie Power Company.—Stock in this company is sold by employees through personal solicitation of consumers. No commissions are paid and no advertising is used.

Great Western Power Company.—This company maintains a separate stock sales department, salesmen being paid entirely on a commission basis. Regular employees cooperate with stock salesmen without special compensation. Newspaper advertising and stock sales bulletins are prepared and used by the stock sales department. No commissions are paid other than those to salesmen. Commissions average about two points.

Idaho Power Company.—The large increase in customer owners in this company in 1923 was accomplished through two special stock campaigns conducted by the employees of the company. Newspaper advertising and bulletins were used during the campaigns. Commissions paid to employees vary with the number of shares sold to any one subscriber.

Los Angeles Gas & Electric Corporation.—Stock is sold by employees, banks and licensed brokers. Newspaper advertising and stock circulars are used to advantage. A commission of 50 cents and $1 per share is paid depending upon the number of shares sold.

Northwestern Electric Company.—This company maintains a separate stock sales department in charge of a stock sales manager. The manager is paid a flat sum per share for every share sold, from which he pays for newspaper advertising, circulars and the commissions of salesmen and employees. Stock salesmen receive $3 and employees $2.50 per share sold. The operations of the stock sales department are carefully supervised by the management.

Pacific Gas and Electric Company.—The fundamental activities of the stock selling campaigns of this company follow:

A. Bringing prospects into offices
   1. By circularization.
   2. By newspaper advertising and reading notices.

B. Teaching offices how to handle these prospects
   1. By personal contact with head of stock sales department.
   2. By circulars giving facts and selling arguments.
   3. By keeping a personal representative of the manager of stock sales moving among the district offices.

C. Keeping the organization enthused
   1. By assigning quotas to divisions.
   2. By paying small commissions to employees.
   3. By stimulating and informative bulletins issued from time to time.

The commissions paid to employees are $1 per share for the first five shares and 25 cents for each additional share over five. In addition $1 is paid for each new subscriber irrespective of the number of shares sold.

Pacific Power & Light Company.—All sales in this company are made by regular employees, who are organized into competitive teams of about twenty-five members. Intensive campaigns of about three months' duration are put on each year. Campaigns are accompanied by newspaper advertising, posters which are displayed in district offices, and stock circulars. Employees are given team prizes and individual bonuses. Maintenance of a strong spirit of team rivalry has been an important factor in the success of the campaigns. On cash sales employees are paid $3 for the first share and 50 cents for each additional share. On sales made on a time payment basis $2 is paid for the first share and 50 cents for each additional share, due on the payment of 40 per cent of the subscription.

Portland Electric Power Company.—This company maintains a stock sales department under the direction of a stock sales manager. Salesmen are also employed. Employees work in conjunction with this department. Newspaper advertising is used. A house-to-house canvass is made of all consumers. Commissions range from $1 to $3 per share for employees and from $2.50 to $3 for salesmen, depending upon the number of shares sold to one subscriber.

Power
from Melted Snows
SEVEN REASONS WHY
Coast Valleys Gas and Electric Company
THE FASCINATING STORY
of the
"Distant Pastures"
Buy "L. A. Gas" Preferred
Our Territory
Buy "L. A. Gas" Preferred
-a good straightforward way to put
that New Year's Resolution
into action!
Puget Sound Power & Light Co.
"Share in the Earnings"
invest
in the Puget Sound Power & Light Company and let your dollars
earn
and serve
in your own community
Insure your future Income
Some Edison Facts
63,000 Stockholders
4,750 Permanent Employees
$179,000,000 of Assets
$14,982,000 earnings in 1923
Serves 312 cities and towns
Over 215,000 customers
SOUTHERN CALIFORNIA EDISON COMPANY
FOURTH FLOOR, EDISON BUILDING
LOS ANGELES, CALIFORNIA
October 18th, 1923
Dear Sir:
Your future income will depend upon how wisely you invest your money today.
Let us call your special attention to an unusually sound investment you can make in
SOUTHERN CALIFORNIA EDISON COMPANY
7% CUMULATIVE PREFERRED STOCK
With 62,000 stockholders, $179,000,000 of assets, and a record of fifty-four consecutive dividends, it is hardly necessary to point out the security of this investment.
And consider these additional advantages: It pays a good rate of interest; has a high borrowing power; is easily sold at short notice in case of need; is exempt from State Personal Property Tax and Individual Federal Income Tax.
The Southern California Edison Company has for twenty-six years supplied the electrical needs of Southern and Central California, giving a high measure of service at uniformly low rates. Today, it is serving 312 cities and towns in America's fastest growing section.
You can purchase one share or more upon very attractive terms. As little as $5.00 per month enables you to become a stockholder.
Become one of the 62,000 Edison Partners now building for the future of Southern California -- partners in one of the most soundly financed utilities of the country -- receiving dividends regularly.
For complete information tear off and mail the attached card or call at any one of our thirty-two offices.
SOUTHERN CALIFORNIA EDISON COMPANY.
SOUTHERN CALIFORNIA EDISON COMPANY
4TH FLOOR EDISON BLDG.,
308 WEST THIRD STREET,
INVESTMENT DEPT. LOS ANGELES, CALIF.
HOW MONEY GROWS
I Never Saved a Cent !
34c
saved each day will soon pay for one of the safest and most desirable investments obtainable—a share of Preferred Stock of
Pacific Power & Light Co.
Great Western's

Samples of direct-by-mail literature and bulletins used by Western utilities in furthering the sales among customers.

Public Service Company of Colorado.—The year 1923 marked the launching of this company's customer-ownership program. A detailed description of the methods employed in the one campaign staged during that year appeared in the Journal of Electricity for Feb. 15, 1924. Employees were divided into two armies and these into teams. A house-to-house canvass of consumers was made. Employees were furnished with the names of prospects where they had none of their own. The campaign was highly successful. A commission of $2 per share was paid and in addition $5 was paid for each new subscriber. Extensive newspaper advertising and direct-by-mail literature was used, all of which is described in the issue noted above.

Puget Sound Power & Light Company.—The stock selling activities of this company are handled through a distinct organization known as the Puget Sound Power & Light Securities Company which was organized in 1923 for the selling as well as the re-purchase of stock. Employees cooperate with the salesmen of the Securities Company. An extensive advertising campaign in city dailies and country weeklies has been consistently followed. Posters are displayed in district offices and other company buildings. Leaflets with a return postal are mailed out with monthly statements to consumers. Prospect cards are prepared for employees to follow up. Salesmen receive $2 per share commission. Employees receive $3 for the first share to new stockholders and 50 cents for each additional share.

San Diego Consolidated Gas & Electric Company.—Stock is sold to consumers by regular salesmen and employees through personal solicitation. Newspaper advertising is employed during January and July when special stock sales efforts are made. Customers' gas and electric bills are also used for advertising purposes. Employees are paid a commission of 1 per cent and salesmen receive 2 per cent.

San Joaquin Light & Power Corporation.—The entire San Joaquin Power organization takes part in the stock sales efforts of that company. Supervision of the stock sales is in the hands of a manager. During 1923 the plan followed was to assign definite quotas to each district, the larger districts being in turn subdivided into departments. Two special campaigns were staged during the year, the first taking the form of a baseball series with each district as a team and the second, in the fall, following out a football schedule. Special rules were devised and considerable competition worked up between districts. The company uses newspaper and local magazine space for advertising. Special bulletins are also prepared. Commissions of $1 for each new subscriber plus $1 per share for the first ten shares and 50 cents per share for all over ten shares. On sales to old subscribers a straight commission of 50 cents per share is paid. For the district averaging the greatest number of shares per sale for the period Jan. 1, 1924, to May 31, 1924, a bonus of 25 cents per share on all shares sold in the district during that period was paid. As a special consideration, the manager of each district that averages its monthly quota for the first five months of 1924 will be sent to the Pacific Coast Electrical Association convention. Special prizes are awarded the salesman and the saleswoman attaining the highest totals during the year.

Southern California Edison Company.—This company has developed its customer-ownership activities to the highest degree. Briefly the plan followed is:

1. Have the employees themselves first become stockholders in the company by purchasing stock on an easy payment plan.
2. Appropriate stock selling advertising is run in all metropolitan and country newspapers in the territory served.
3. The employees during their spare time interview friends, relatives and neighbors in regard to the purchase of stock, having literature, subscription blanks, etc., with them at the time.
4. A sticker is put on all bills sent out to consumers calling attention to the company's stock and its investment possibilities.
5. About once a year every consumer is circularized with appropriate literature.
6. Each district puts on a stock selling campaign with employees divided into teams of five, ten or twenty men and women. Each district has a definite quota of shares or new stockholders to obtain and these are divided among the teams.
7. All district office windows have stock selling posters and literature on display to attract the attention of the general public.
8. The company has about 25 security salesmen operating under the stock sales manager, who devote their entire attention to stock selling.
9. Permission is obtained from factories to allow an Edison representative to address employees during the noon hour on how the Edison company is building up the community and how the company raises one-third its money through the sale of stock. When the talk is completed permission is usually obtained to allow security salesmen to talk to the individual employees. This method of getting the working man of moderate means interested in the company's securities has given very good results.

The commissions paid on stock sold by employees average 50 cents per share.

Southern Colorado Power Company.—Stock sales are handled entirely by the employees of this company. Liberal newspaper space is used and customers are circularized from time to time. Each division or district manager has charge of the sale of stock in his territory. A commission of $2 per share is paid.

Washington Water Power Company.—The public relations department is charged with the supervision of the sale of stock of this company. Five special salesmen are employed who devote all of their time interviewing customers and citizens residing in the territory with a view of interesting them in the securities of the company. A maximum of ten shares to any one person has been set. Salesmen are guaranteed $150 per month plus a commission of 50 cents per share. Employees are paid 50 cents per share on all tips which result in sales.

Western States Gas & Electric Company.—An investment department is maintained for disposing of the stock of this company to the public. The department consists of a manager, secretary and four salesmen. The manager and secretary are salaried employees. The salesmen work on a commission basis.

Great care has been devoted to the preparation of advertisements by the companies and some highly creditable copy has been run in the newspapers of the eleven Western states. Some of the companies have prepared advertising series which have been used on a regular basis. Similarly the stock sales literature distributed to consumers and public has been excellent. Samples of both newspaper copy and bulletins are shown herewith.

All of the companies have adopted the practice of selling their securities both to the public and to their employees on an easy payment basis. Small down payments are exacted and the balance is made payable over a period ranging from ten months to two years. The advantage of this plan is self-evident. One of the chief sales arguments has been that utility stocks are easy to buy on this account.

Figures on the cost of selling stock to the public vary, depending, seemingly, upon the method adopted by the particular company and the length of time such activities have been pursued. Those companies which have followed the customer-ownership plan for a number of years show a very low cost, while those which have just undertaken the work must pay high development costs. One large utility shows a selling cost per share of but 88.5 cents. In one or two cases this cost reaches $7 or more. A fair average for all of the companies is $4.50.

Irrespective of the cost, the fact remains that utilities have benefited since the introduction of the customer-ownership idea. Better public relations, an increased public interest in the utility's welfare and a sounder financial position due to the increased distribution of junior securities are but a few of the beneficial results. It is safe to say that 1924 and each succeeding year will see a greater democratization of public utilities as more and more of their consumers are taken into partnership.

Electricity Versus Oil for Heating Iron Enameling Furnaces

By H. A. Mulvaney

Designing Engineer, Electric Sales Service Company, Berkeley, Calif.

ELECTRICITY continues to demonstrate its practicability in new fields. Wherever heat is required it is found that electricity is taking the place of other kinds of fuel. In this article, Mr. Mulvaney makes some interesting comparisons in costs of operation and results obtained in the use of electrically heated enameling furnaces and of those in which fuel oil furnishes the heat, at the plant of the Pacific Sanitary Manufacturing Company, Richmond, Calif.

THE first electric furnace ever installed for enameling cast iron ware was put into operation in the plant of the Pacific Sanitary Manufacturing Company, at Richmond, Calif., in December, 1920. This furnace was an experiment, having been built in the muffle of an old oil-fired furnace to check computed figures on radiation and conduction losses and to demonstrate the possibility of using an electric furnace in this industry. The experiment was sufficiently gratifying to warrant the construction of a permanent electric furnace for enameling tubs. The first furnace was of 150-kw. capacity, capable of operating continuously at a temperature of 1,800 deg. F. The design of this furnace has been modified only slightly in subsequent furnaces, and the electrification of this enameling room has continued until it has a load in enameling furnaces of 1,350 kw.

The process of enameling a tub starts with the spraying of the thoroughly cleansed and sand blasted casting with a so-called "ground coat" which consists of a suspension in water of powdered glass, clay and other materials. When the "ground coat" has dried the tub is placed in the furnace, which is heated to a temperature of 1,800 deg. F. until the ground coat is thoroughly fused, forming a thin layer of transparent glass on the casting. This operation takes from seven to ten minutes. The tub is then withdrawn from the furnace and immediately coated by means of long handled sieves with a layer of opaque white powdered glass, known as the "cover enamel." After having cooled to about 800 deg. F., the tub is returned to the furnace for three minutes, during which time the cover coat fuses to a smooth layer. A second cover coat is applied in the same manner and the tub is again withdrawn and inspected, and if it is free from bubbles and blow holes it is allowed to cool as a finished article.

The enameling of a tub is an operation requiring skill and judgment since each coat must be evenly distributed and the tub removed for each operation at the proper temperature. The operation requires three men; an enameler, whose duty it is to enamel the inner portion of the tub, a rimmer, who enamels the rim and withdraws the tub from the furnace, and a wheel-turner, who rotates the tub on a table during the enameling process. The tub is taken to and from the furnace by a swing fork, hung from a beam arranged with a lever arm so balanced that it may be handled by one man.

Cast iron enameling, previous to this installation, had been carried on in this plant in oil-fired muffle furnaces. In the muffle oil furnace, combustion takes place under the floor in the flues. The combustion gases pass up and around the muffle, which is made of cup brick to facilitate conduction, and into the stack, and do not come in contact with the ware. The undesirable features of such a furnace are its rapid rate of depreciation, its inability to maintain uniform temperature, and its uneven floor due to the sagging of its fire box. The cause of this last defect is that to maintain a temperature of 1,800 deg. F. in the muffle, the temperature in the fire box is above the working limit of ordinary refractories. The destruction of such a furnace is quickened further by the impact of a 240-lb. tub on the floor nine or ten times per hour. The floor in such a furnace consequently begins to sag the first week of operation and has to be replaced within four to eight weeks. The rail of the buck, upon which the tub is placed, will follow the uneven floor, and if the tub is not uniformly supported, it will warp.

This defect in an oil furnace can be readily overcome in the electric furnace; but the electric furnace presents difficulties of an entirely different nature. The first requirement is that the temperature of the muffle must be held at 1,800 deg. F. To maintain such a temperature nickel-chromium is the most desirable material for the electric element. Previous experience with this alloy has demonstrated that in large cross-sections it can be operated for a number of years at a temperature of 1,900 deg. F., but if this temperature is exceeded in any part of the element, frequent replacements will be necessary. Since replacement of an element requires the cooling down of the furnace to a temperature at which it may be entered, it is quite evident that frequent replacements would cause costly shut-downs and would make an electric furnace impossible in this industry. Another difficulty to be confronted is the frequent

breaking of a tub within the furnace. The elements have to be protected so as to prevent the broken ware from coming in contact with them, or a low enough voltage applied to the elements to prevent serious difficulty.

Features of Single Oven Electric Furnaces

Electric furnaces with but a single door, which are now used for enameling small ware, have inside dimensions of 10 ft. 1 in. wide by 10 ft. 4 in. long. The spring of the arch is 16 in. above the floor and the center of the arch is 4 ft. 6 in. above the floor. The inner walls of the furnace are made from a special supporting brick which holds the ribbon element in place. There are eight elements in the arch, two in the side walls and three in the floor. Any one of these elements may be disconnected to permit temperature adjustment within the furnace, and the voltage applied to the elements may be varied from 40 to 80 volts in ten-volt steps. With such an arrangement the voltage may be adjusted and held constant to suit any weight of ware to be enameled.

The furnace side walls, back and arch, are surrounded with 10-in. infusorial earth which is held in place by a 9-in. outer wall of brick. This construction makes the heat loss due to conduction and radiation very small, the greatest being around the doors. The maximum power input is 150 kw., though 200 kw. may be obtained by a system of voltage taps. Three of the above type furnaces, constructed by the Electric Sales Service Company, Berkeley, Calif., are now in operation at the plant of the Pacific Sanitary Manufacturing Company and two are being used at the plant of the Santa Fe Foundry Company. Some of these furnaces have now been in continuous operation for three years.

Double Chamber Muffle Oil Furnaces

In some plants in the East, double chamber furnaces are used, in which the firing is all done on one side. Part of the product of combustion passes under the floor of both chambers and up the fire wall of the second. The other part passes entirely over the top of the first chamber, through the division wall near the floor level, and up the inner side of the second chamber. The first chamber is always a muffle, but the second usually is operated as a semi-muffle furnace.

The final melting of the ground coat and all the baking of enamels is conducted in the first chamber, which is kept at ordinary enameling furnace temperature. The second chamber, which is at a dull red heat, is employed for preheating the tubs, covered with a ground coat, to dull redness. Such a furnace, although economical in fuel consumption, is hard to control as to temperature, and the maintenance is high, so it has not proved popular.

Construction of the Duplex Furnace

It is evident that if two small furnace chambers are built within the original area of one, two furnaces with the radiation loss of but one are secured. The door loss from two doors is present but if the furnaces are used for tubs only the doors can be made small, thus cutting down this loss. With two high temperature chambers available, one tub can be undergoing the finishing process while another is heating. In such a furnace it should be possible to double the production with the same number of man hours, by an increase of 50 per cent in electrical energy.

In locating heating units in such a furnace, seven elements are installed in the arch, two on the side wall, two on the center partition and six on the floor. Any number of these elements may be disconnected. The six floor elements are on magnetic contactors, and in practice it is customary to connect three of these six elements on an automatic temperature control.

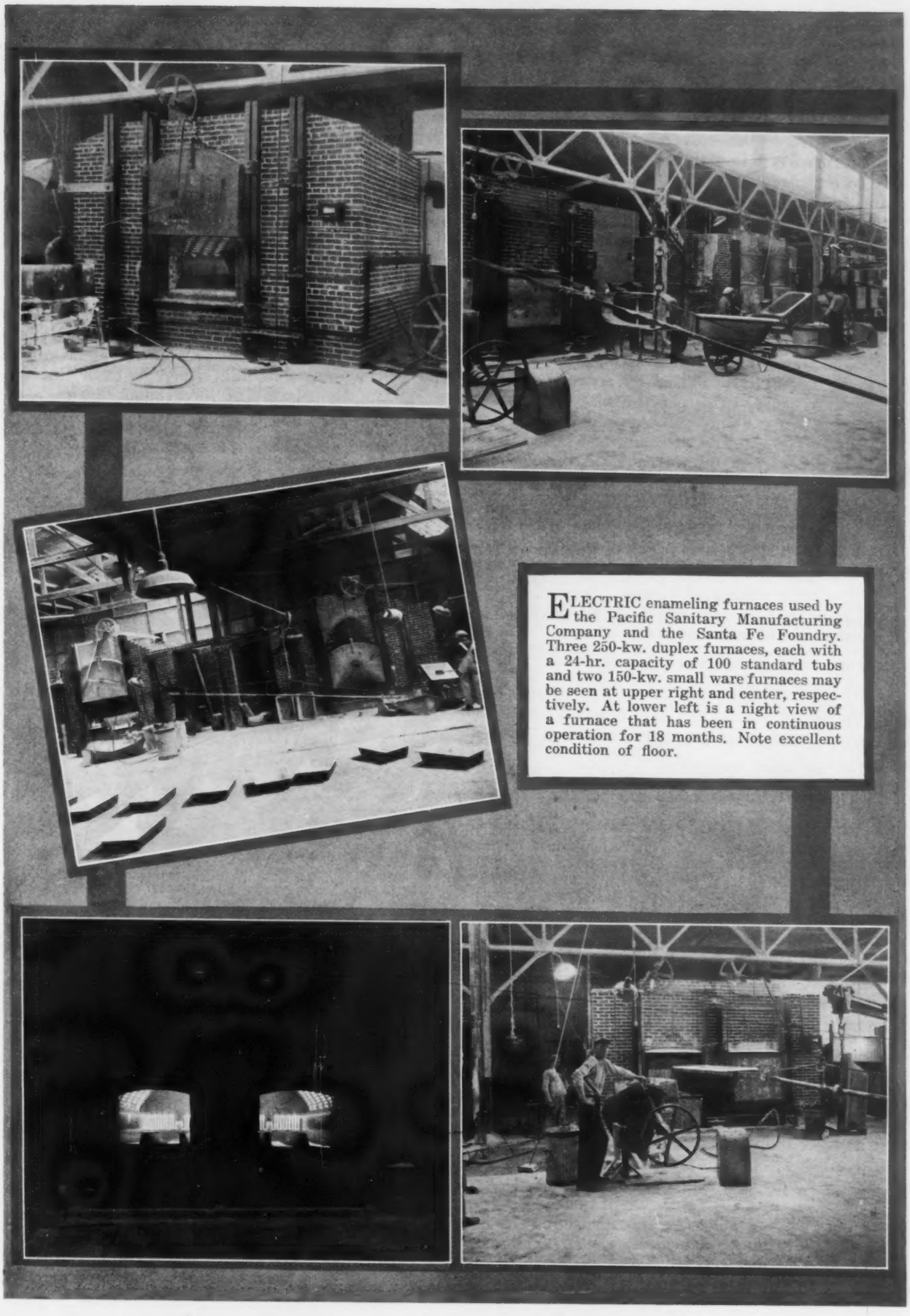
Operating Characteristics

One of these duplex furnaces has been in continuous service for eighteen months and although the production has not been doubled by the use of the duplex electric furnace, a 50 per cent increase in production has been obtained on standard tubs and as high as 75 per cent more of certain special tubs has been turned out with the same number of man hours. The enameling crew works six hours on the duplex furnaces and produces more ware on the 6-hour shift than was formerly produced in eight hours, and since the enamelers are paid on a piecework basis, the 6-hour shift does not increase the cost of labor.

There is no question but that electric energy is the ideal heating agency for enameling furnaces, due to the long life of the furnace, the cleanliness with which it can be used, and the possibility afforded by its use for temperature control within the furnace and the accurate automatic control of the mean furnace temperature. The problem therefore is an economic one. Can electrical energy be obtained at a cost so that the manufacturer using it can compete with the manufacturer using other types of fuel? It is believed that it can on the West coast, and the following figures on fuel costs in furnaces using oil and electric energy are presented to bear this out. In making this comparison it is necessary to consider the amount of production obtainable from each type of furnace, and also other costs inherent in each type, such as maintenance and depreciation, so that the cost per unit of work may be obtained.

Production and Costs Compared

For the purpose of comparing the production from each type of furnace, the standard 5-ft. tub only is considered, but the results obtained in tub production could be assumed to approximate the same proportion in other kinds of work done. The average number of 5-ft. tubs obtained from an oil-fired furnace in the plant described above was eighteen per 8-hour shift. When this average was increased the life of the furnace was greatly decreased. In comparing these results with those obtained in other plants, by referring to the U. S. Department of Commerce Bulletin No. 142, by Homer Staley, page 159, it may be found that the time allowed on tubs weighing between 200 and 300 lb. was 30 minutes, or a production of 16 tubs in eight hours. Due to the low temperature in the front end of oil fur-



ELECTRIC enameling furnaces used by the Pacific Sanitary Manufacturing Company and the Santa Fe Foundry. Three 250-kw. duplex furnaces, each with a 24-hr. capacity of 100 standard tubs and two 150-kw. small ware furnaces may be seen at upper right and center, respectively. At lower left is a night view of a furnace that has been in continuous operation for 18 months. Note excellent condition of floor.

naces, it is common practice to remove the tub during the first heating to rotate it. This operation is not necessary with the electric furnace because of the even temperature maintained throughout, and therefore at least two more tubs per shift can be obtained from an electric furnace.

To arrive at the cost of maintenance of the electric furnace it is assumed that it will be necessary to replace all the heating elements in three years, and the maintenance and depreciation on this type of furnace has been placed conservatively at $37.50 per month. The useful life of an oil furnace is three years and its cost is $3,000. Replacement of the floor is necessary six times a year, at a cost each time for labor and material of $130. The total depreciation and maintenance, therefore, is about $150 per month. Furthermore, since the oil furnace floor warps and settles within the first week of operation, and since heating the tub slightly above the desired temperature causes it to take the shape of the supports, there is great danger of obtaining warped ware from such a furnace, and there must be added to the costs a loss covering this warpage. After considering reports by other investigators treating this subject, this loss has been placed at $60 per month.

The cost per tub, therefore, on each type of furnace, using the price of oil at $1.40 per bbl., and of electricity at 8c. per kw-hr., is figured as follows:

Muffle Oil Furnace

Oil consumed per 24-hr. operation of tub furnace	11 bbl.
Oil consumed per 24-hr. for atomizing	2.5 bbl.
Total consumption for 24-hr. period	13.5 bbl.
Oil consumed in 25 working days per month, 13.5 x 25	337.5 bbl.
Oil consumed in 4 Sundays per month, 8 x 4	32 bbl.
Total oil consumed per month	369.5 bbl.
Cost of oil per month, 369.5 x $1.40	$517.30
Cost of maintenance and depreciation per month	150.00
Cost due to warpage per month	60.00
Total operating cost of furnace per month	$727.30

Based on a production of 57 tubs per 24 hours, and figuring 25 working days, a production of 1,425 tubs per month is secured from the muffle oil furnace, at a cost of 51c. per tub.

Duplex Electric Furnace

Average monthly electric energy consumption equals 133,000 kw-hr.

Cost of electric energy, 133,000 x $.008	$1,064.00
Cost of maintenance and depreciation	37.50
Total operating cost of electric furnace per month	$1,101.50

Based on a production of 96 tubs per 24 hours, there is a monthly production of 2,400 tubs from the electric furnace, at a cost of 45.8c. per tub.

In the above comparison the electric furnace is not credited with a better product nor with the reduction in rejected ware during the enameling operation, and yet the electric furnace does produce this desirable result. Due to the lack of reliable data it is extremely difficult to make a comparison in dollars and cents, but the principal factor in the economy in the use of the duplex electric tub furnace is the increase in production obtained with the same number of men as was formerly employed on a single oil furnace.

Recommending Safety and Courtesy to Company Car Drivers

DEVELOPED along much the same lines as the telephone plaque advising users of the instrument to "Say It with a Smile," that The California Oregon Power Company inaugurated some months ago, is an emblem designed for use on the automobiles of that company. The Medford, Ore., utility has attached the new emblems to all company cars in order that safety first may be the motive of each driver. The automobile emblem is also designed to encourage a spirit of courtesy among employees who are driving company cars upon the road.

The new emblem is in the shape of a keystone, the company's emblem, and is made of brass and is etched in black to form the background for the illustration and lettering. The face of the emblem carries a view of a mountain range with a lineman working on a pole in the foreground.

The emblem, reproduced above, is of metal and is permanently attached to the instrument board of the automobiles owned by The California Oregon Power Company.

The "Code of the Road" emblem is attached to the dashboard of each company car and truck in order that it may be in plain view of the driver at all times. The suggestion to "Drive with Care—Remember the Golden Rule" is a constantly visible reminder that has been found to be most effective in reducing accidents and in developing a spirit of courtesy on the road.

The emblem has not only reacted favorably among the employees of the company but has also elicited a large amount of favorable comment from those of the public that have seen it. By showing that it is anxious to serve its customers courteously and to care for the safety of the general public The California Oregon Power Company has increased the good will in the community where it operates, at exceedingly low cost.

A Proposed Plan for Improving and Increasing Electric Appliance Sales

By George W. Barker
Associate Editor, Journal of Electricity

WITH the broadening of the channels of distribution of electrical appliances and with the increase in the variety of these devices, a situation has arisen which demands the immediate attention of the industry. Ignorance of the commonest characteristics of such equipment on the part of salespeople handling them has resulted in loss of sales and in dissatisfaction on the part of consumers. This article outlines a plan for educating the salesman and saleswoman who place appliances in the hands of the public.

AT the close of 1923, one of the McGraw-Hill papers made an investigation of electric appliance sales. A careful study was made of the growth of the entire country, this study including population increase; increase in number of wired homes; amount of electric energy generated; residence load; number of telephones in use; number of automobiles registered; sales of general lines of manufactured products and sales of electric appliances. The period of the investigation embraced the years 1920 to 1923, inclusive.

This study did not reflect credit on the electrical industry. Instead, it showed that of nearly all the major businesses of the country, the electrical appliance business almost alone had fallen behind in percentage increase; had, in other words, allowed the competition of other business to outstrip it and to interrupt its logical growth. The number of automobile licenses issued had increased fifty per cent in 1923 over 1921; iron and steel production increased forty per cent in 1923 over 1922; copper production increased fifty per cent; automobile production increased sixty per cent; leather increased ten per cent; and yet—the electric appliance penetration at the end of 1923 was actually two per cent less than at the end of 1922, and 1922's penetration was two per cent less than at the end of 1921.

Now, this was not because of a decrease in the number of possible customers. On the contrary, the total residence consumers at the end of 1923 was 9,903,828, or 1,353,828 **more** than at the close of the preceding year. This increase in consumers alone offers an attractive prospect list, even without regard to the millions of previously existing consumers who have not yet purchased all of the appliances in common use. Further, it takes no cognizance of the 8,175,510 homes in front of which the power companies' lines pass but which are still to be wired for electric service. In the face of these figures—which are as accurate as may be obtained and which were compiled from many sources, including the U. S. Department of Commerce—one can hardly say, with justice, that the failure of the electric appliance business to maintain its stride is due to a decrease in the number of prospects or to unfavorable business conditions.

The logical deduction to be made would seem to be that the electrical appliance merchandising set-up has failed. It is not a pleasing indictment to answer. No other deduction, however, seems possible. Manufacturers in other lines, covering the same territory, showed increases for one year of ten to sixty per cent, and yet the electric appliance saturation has dropped two per cent a year for each of the past two years. This does not, of course, mean that the gross volume of electrical appliances has decreased; on the contrary, it increased roughly $250,000,000 in 1923 over 1922, which latter year showed a decrease of approximately $67,425,000 from the gross volume of 1921. These volume figures on appliance sales may be accepted by the most skeptical for they were compiled from conservative estimates made by some four hundred authorities in their particular lines.

Why Retail Sales Do Not Keep Pace

The question naturally arises—"Why does this condition exist?" A seeker for the truth must face the facts and from these facts must draw his conclusions. With this thought in mind, a careful study of electric appliance merchandising has been made by the Journal of Electricity, particularly with reference to the sales efforts put forth by clerks, solicitors, proprietor-salesmen and all others who take part in retail selling. This investigation of sales procedure brought forth many startling facts, the chief of which is that many retail sales employees are woefully, sometimes almost hopelessly, ignorant of even such elementary information as the proper application of electric appliances. The amount of misinformation observed is appalling. It is small wonder that appliance sales are decreasing in percentage. Within the scope of this investigation 660-watt heaters have been sold to heat a house, heating pads have been passed out to serve the purpose of warming quilts, waffle irons have been advocated as table stoves, immersion heaters of the lamp socket type have been recommended for "quickly" boiling a gallon of water, a grill stove has been declared to be

capable of roasting, toasting, boiling, baking and broiling at one time, and one has been told that one did not want to buy an electric ironer because "it costs too much to operate." Perhaps, after all, the marvel should be not that appliance saturation is lowering at the apparent rate of two per cent a year but, rather, that the rate is not much greater.

Education of All Sales Forces Proposed

The apparent cause of this condition being ignorance on the part of sales forces, it is only logical to take steps to overcome that ignorance. This can be done in only one way—by education. A systematic plan embracing fundamentals of electric appliances—as to types and applications, not as to technicalities—seems the surest and quickest method of placing electric appliance sales effort on a sure footing. It seems, too, to offer the elimination of poor selling—of selling the wrong device for a specific purpose, or of misrepresentation through ignorance. It should make for honest, intelligent sales effort and should result in increased satisfaction in appliance use. This, in turn, will make itself felt in increased appliance sales and there will be the satisfaction to all concerned that always accompanies good merchandise, honestly sold and properly applied.

Such a plan, worked out in detail and broadly applied on a national scale, cannot fail to improve the character of sales effort and must result in a more intelligent service to the consumer. Any plan that will accomplish these two purposes cannot fail to achieve results.

Based upon the observations made in this trade survey and shaped to the needs of the trade as learned from the study of trade practices, an outline has been prepared to show what the electrical appliance industry must do to solve the problem. It appears that unless some such plan is put into effect within a relatively short time, the appliance sales volume will be even more affected than it has been during the past few years. Inasmuch as many people become familiar with electricity through the use of domestic appliances it is at once apparent that the present situation is of concern to all branches of the electrical business. Therefore manufacturers, jobbers, dealers, constructionists and all others should alike give heed to the need for this instructive effort. The plan in its fullest operation will, of course, be costly, but reduced sales volume will be more costly still. The past two years have already proved the trend of sales with the retail selling force in its present unguided state. The expense, when divided fairly, will be but a slight burden on any branch of the industry and should bring returns far beyond the cost.

With this thought in mind the following analysis of the situation is presented. It is recognized that this is fundamental only and that the many details of application must be worked out before the plan functions fully. However, this is a foundation on which to build a working schedule of appliance information that, it is hoped, will serve to enlarge the service to the consumer, increase the satisfaction to be derived from the use of electric appliances, promote intelligent and honest selling and multiply volume.

National Organizations to Direct Work

It is apparent that the first requisite is for the National Electric Light Association or the Society for Electrical Development to recognize the existing situation above mentioned. Evidences of the condition abound on all sides in every city and town and in all stores retailing electric appliances. The condition having been recognized and acknowledged by one of the national cooperative organizations, that organization should cooperate with the other large organizations of similar nature, and with local geographic organizations, in preparing informative bulletins for distribution to employees within the scope necessary. These bulletins should be short and pithy, preferably of one page each, and should be divided into the various series into which electric appliances naturally are classified; for example, socket devices; ranges, water heaters, air heaters; labor-saving devices, such as washers, ironers, vacuum cleaners, dish washers, etc., miscellaneous devices, such as violet ray machines, hair dryers, utility motors, etc. These classifications may also be made in accordance with that part of the home in which they are most liable to be used; for example, kitchen devices; laundry devices; toilet devices, etc.

Character of Information Required

The bulletins should be interestingly prepared in simple language refraining, so far as possible, from technicalities. They should generally be illustrated with a **type** of the device under discussion but should **not** be made propaganda for an individual manufacturer. The bulletins should be numbered serially and should be in such form as to permit binding in a loose-leaf binder. The subject matter of these bulletins should include application of the device described, wattage, voltage, whether or not special wiring is required, finish or finishes, price ranges, special appeal of the device to men or women, cost of operation at a unit rate for energy (this unit rate to be, perhaps, the average rate for the entire country for the service on which the device is most liable to be used). Any other information pertinent to the device or considered desirable of presentation may also be incorporated.

Proper Wiring Informaion Needed

These bulletins should also contain reference to the need for adequate convenience outlets in order that appliances may be **conveniently** used. The safety factor involved in the use of convenience outlets should also be stressed as should be the danger of using appliances connected to lighting fixtures where these fixtures are overhead or on a side wall.

Special attention should be paid in these bulletins to the matter of adequate wiring, not only for socket devices but also for the use of appliances that may be purchased in the future. Particular effort should be made to tell of the need for proper provision for wiring, or at least for conduit—both entrance and distribution circuit—for the present or

future use of an electric range, water heater or air heaters.

Plan of Distribution

These bulletins should be issued at regular and frequent intervals in order to stimulate interest in the subject matter involved. Distribution should be to all sales and public-contact employees, and members of the organizations enumerated below and at no cost whatsoever to the recipient. Distribution may be handled in such a manner as to ensure the relative effectiveness of the literature. If a charge is made to the employee for this material the field of distribution will be very materially narrowed and the value of the whole effort will be minimized. The plan of distribution without cost to the employee will make for maximizing of the success of the endeavor and should result in improved sales efforts.

Distribution of this material should be through the following channels:

(a) Jobbers—Electric, hardware, household goods, drugs
(b) Dealers—Electric, hardware, household goods, drugs, furniture
(c) Central stations
(d) Manufacturers' agents—Electric, hardware, household goods, furniture, drugs
(e) Architects
(f) Builders
(g) American Institute of Electrical Engineers
(h) Apartment house owners' associations
(i) American Federation of Labor
(j) International Brotherhood of Electrical Workers
(k) Such other outlets as deemed advisable or desired

Distribution should be in accordance with the following general plan:

(a) Nationally by the National Electric Light Association; the Society for Electrical Development and the Joint Committee for Business Development.
(b) Geographically by the state or geographic cooperative campaigns or associations.
(c) By manufacturers, jobbers and other groups that desire to avail themselves of this service and who would buy the bulletins at production cost.
(d) The information to be compiled into interesting composite papers for presentation by radio.

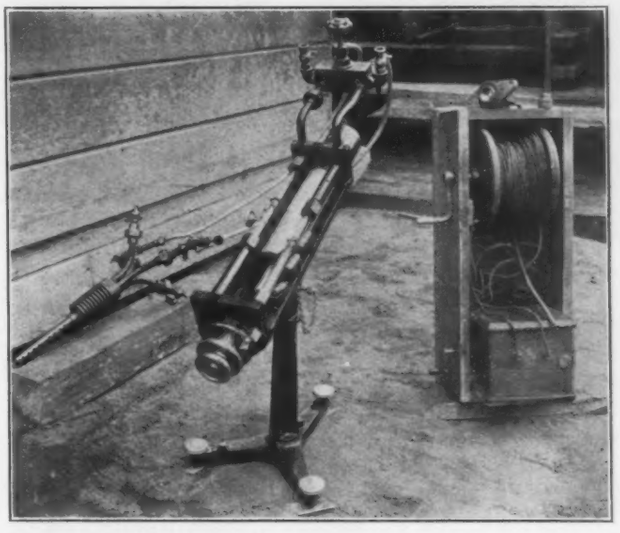
From the above brief outline of the plan proposed for the relief of the situation it is evident that the cost of the plan will be spread out over the entire industry, those agencies that are most able to do so standing the major expense. This expense, in quantity production, will doubtless be much less than at first appears. It should, even at the highest figure, be less than the present losses that result from weak, unintelligent and often deliberately untruthful sales effort. No charge is made that the untruthful effort is inspired but there is no denying that it does exist. Education is a cure for ignorance, which very easily may be taken as the cause for the present condition.

Such a plan, properly functioning, should serve to increase employee interest in electric appliances, to improve sales effort, to produce greater consumer satisfaction and to develop volume. It should, too, place appliance sales on a firmer foundation and should result to the betterment of every branch of the electrical industry.

Power Company Diagnoses Pump Troubles for Farmers

AS a service to the farmers of the San Joaquin Valley where electric pumping is the chief source of water for irrigation, the San Joaquin Light & Power Corporation has recently established a department for pump testing along the lines of a similar department maintained by the Southern California Edison Company. The company maintains the necessary apparatus for obtaining complete data regarding pump efficiency, motor characteristics and other means of improving operating conditions. The information brought out by tests conducted so far has proved to be of great value to farmers, pump manufacturers and power companies.

The over-all efficiency of the pump is calculated from the discharge, the power input and the measured lift. Where weirs, concrete reservoirs or tanks are installed at the plant the discharge can be measured easily enough. However, many plants discharge directly into pipe lines and in such cases a General Electric flow meter is used. The power input is ordinarily determined by timing the revolutions of the meter. The lift is determined in several ways, depending upon the character of the installation. Where water is discharged at a higher level a calibrated pressure gage is used. When deep well turbines are installed in well casings a small electric sounder is lowered by means of a steel tape. In some cases the water level is determined by air pressure.



General Electric flow meter used in making tests of electric pumping installations in the San Joaquin Valley. Sounding apparatus for electrically determining the water level in deep wells is shown at the right.

Tests made so far indicate that there are three principal causes of trouble in a pump installation. The first is that there has been a change in operating conditions since the installation of the plant, the second is pump wear and the third is that the proper design of pump is not used. Seldom has it been found that the power service is at fault.

The COAST Outlet
ELECTRICAL CONSTRUCTIONISTS' and DEALERS' NEWS

Electrical Construction

By E. Earl Browne

FOR those who do not desire to use a form with the materials printed on a labor and material listing sheet, it is convenient, when reading the specifications preliminary to counting the outlets, switches, signals, and measuring up the service, subfeed and circuits, to have a reminder sheet such as is shown in Fig. 6. This covers all the high spots of most of the jobs and by checking over with the final labor and material list it is possible to pick up all the larger items which might have been omitted from the estimate. A summary sheet as shown in Fig. 7 is particularly valuable in reminding the estimator of incidentals such as inspection, painting, freight and cartage, board and lodging, traveling time and traveling expense.

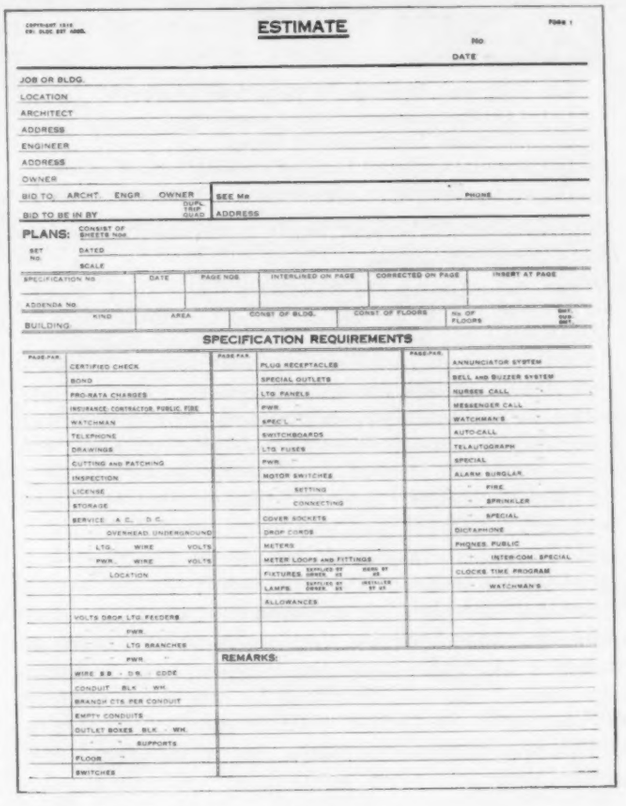
The objection to so many sheets of paper and forms for the ordinary job is that it is very easy to lay aside and omit one of the material and labor sheets from the summary unless the estimator is careful to number all sheets as they are used.

In taking off a job from plans and specifications, it is the hidden clauses which must be guarded against, and it is for this reason that more than a casual glance must be given to specifications. It is a common occurrence in general contract specifications to incorporate a paragraph following the electrical work about as follows:

"FIXTURES.—The sum of $500 is to be allowed by this contractor for electric lighting fixtures. Same to be selected by the owner and paid for by this contractor."

It would seem that this is separate from the electrical specifications, but as it immediately follows them and has no general heading it is well to qualify that you have or have not included the fixtures, as there is then no chance for an argument between yourself and the general contractor. There is another sentence that is often added to the same paragraph, i.e., "Same to be selected by the owner but paid for and installed by this contractor." This item of installing and paying inspection fees for such installation amounts to at least 75 cents per fixture, and, perhaps, two or three times this amount, particularly if it be a job where the fixtures are sent "knocked down" to save expense in packing and freight.

The paragraph in all specifications which states that "all work is to comply with all local, state and Board of Fire Underwriters' rules," does not permit the electrical contractor to claim an extra if local switches in bathrooms, kitchens, and laundries, are



ESTIMATE

No.
DATE

JOB OR BLDG.
LOCATION
ARCHITECT
ADDRESS
ENGINEER
ADDRESS
OWNER
BID TO: ARCHT. ENGR. OWNER — SEE Mr. — PHONE
BID TO BE IN BY — ADDRESS
PLANS: CONSIST OF SHEETS NOW
SET NO. — DATED
SCALE

SPECIFICATION NO.	DATE	PAGE NOS.	INTERLINED ON PAGE	CORRECTED ON PAGE	INSERT AT PAGE
ADDENDA NO.					

BUILDING: KIND — AREA — CONST. OF BLDG. — CONST. OF FLOORS — No. OF FLOORS

SPECIFICATION REQUIREMENTS

PAGE-PAR.		PAGE-PAR.		PAGE-PAR.	
	CERTIFIED CHECK		PLUG RECEPTACLES		ANNUNCIATOR SYSTEM
	BOND		SPECIAL OUTLETS		BELL AND BUZZER SYSTEM
	PRO-RATA CHARGES		LTG. PANELS		NURSES' CALL
	INSURANCE, CONTRACTOR, PUBLIC, FIRE		PWR. "		MESSENGER CALL
	WATCHMAN		SPEC'L "		WATCHMAN'S "
	TELEPHONE		SWITCHBOARDS		AUTO-CALL
	DRAWINGS		LTG. FUSES		TELAUTOGRAPH
	CUTTING AND PATCHING		PWR. "		SPECIAL
	INSPECTION		MOTOR SWITCHES		ALARM: BURGLAR
	LICENSE		" SETTING		" FIRE
	STORAGE		" CONNECTING		" SPRINKLER
	SERVICE A.C. D.C.		COVER SOCKETS		" SPECIAL
	OVERHEAD, UNDERGROUND		DROP CORDS		DICTAPHONE
	LTG. WIRE VOLTS		METERS		PHONES, PUBLIC
	PWR. WIRE VOLTS		METER LOOPS AND FITTINGS		" INTER-COM., SPECIAL
	LOCATION		FIXTURES, OWNER'S $ — SUPPLIED BY — INSTALLED BY		CLOCKS, TIME PROGRAM
			LAMPS, OWNER'S $ — SUPPLIED BY — INSTALLED BY		" WATCHMAN'S
			ALLOWANCES		
	VOLTS DROP LTG. FEEDERS				
	" PWR. "				
	" LTG. BRANCHES				
	" PWR. "		REMARKS:		
	WIRE B.B. - D.B. - CODE				
	CONDUIT BLK. WH.				
	BRANCH CTS. PER CONDUIT				
	EMPTY CONDUITS				
	OUTLET BOXES BLK. - WH.				
	" " SUPPORTS				
	FLOOR "				
	SWITCHES				

Fig. 6.

not shown on the plans but are required by the local ordinance.

One of the most important things to guard against is a mistake in using the wrong scale, as many cheap jobs have been taken by contractors who used a ¼-in. scale when the plan was ⅛ in. and a ⅛-in. scale when the plan was 1/16 in. Sometimes a draftsman is careless and will mark the floor plans ¼ in. when they are ⅛ in. and it is a good plan to

check the figured dimensions on the plans to be sure there are no errors.

Some regular system in taking off a plan with typical floors should be used in order to be certain that all floors are included in the totals. It is also a good idea when pricing materials to use the same unit throughout, as it is a common error to figure an item on the per thousand basis when it should be on the per hundred basis.

In the May 15 issue of the Journal of Electricity a comparison was made between earlier estimating forms and those of present day use. The number of individual items on the earlier forms totaled 259 as given but the individual classifications of materials are 41. All of these classifications are incorporated in the present forms, described in the above issue, which have eliminated much of the detail and have minimized the work of the estimator.

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SUMMARY

FORM 5

JOB EST. No.

BY CHECKED BY APPROVED BY DATE

DATA		SHEET NUMBER	SYSTEM	MATERIAL	LABOR	TOTAL
Ceiling Outlets						
Bracket "						
Plug Receptacle Outlets						
Ceiling "						
Floor "						
Fan "						
Decorative "						
Ceiling Switch "						
Wall " "						
Door " "						
Phone "						
Total "						
Total Lighting Watts						
Connected Circuits						
No. of Motors						
Motor H. P.						
Total Labor:						
Days	$					
INCIDENTALS:						
Bond			Incidentals (see schedule)			
Pro Rata Charges			Non-Productive Labor " "			
Insurance			Total Material $			
Watchman			Total Labor $			
Telephone			Cost of Material and Labor $			
Drawings			25% Overhead $			
Cutting and Patching			NET COST $			
License			20% Profit $			
Inspection			SELLING PRICE $			
Storage						
Painting			REMARKS:			
Freight and Cartage						
Traveling						
Board, Etc.						
Total $						
NON-PRODUCTIVE LABOR						
Job Superintendent						
" Clerk						
Handling Material						
Delays & Conditions						
Travel-Time						
Total $						

Fig. 7.

A Practical System of Accounting for Contractor and Dealer

By F. V. Mitchell

ALL revenue and expense accounts are closed out into capital account through Profit and Loss at the end of each closing period by journal entry, in accordance with the following illustration:

Acct. No.	Account	Dr.	Cr.
50	Sales	$27,817.40	
51	Returns & Allowances		162.75
52	Cost of Goods Sold		18,544.95
60 to 73	Expenses (Detailed)		6,390.50
40	Capital Account (Profit & Loss)		2,719.20

To transfer net profit for calendar year 1923 into capital account.

From the proven totals of the General Ledger Accounts, we are enabled to prepare an accurate Profit and Loss Statement and a true Statement of Condition of the business at the end of each closing period. Both of these statements are of utmost importance in the successful operation of the business as, in fact, without them it is in the identical position of a ship sailing along aimlessly without a rudder and invariably piling up in disaster upon the rocks. It is a proven fact, borne out in the management of all truly successful firms, that there is no safer and saner way to govern a business as to methods of future operations than by the exact results of similar operations in the period just past.

The Profit and Loss Statement as outlined in Fig. 1 contains such vital information as the total amount of Sales, Material and Labor Costs, Gross Profit on Sales, Overhead Expenses, and Net Profit, together with the percentage that each bears to the total sales. It also shows the percentage of Overhead to Material & Labor Costs, which is the most necessary point of information to have in the entire operation of the business, as from this can readily

STATEMENT OF CONDITION
December 31, 1923

ASSETS

Current			
Cash in Bank		$ 962.45	
Petty Cash Fund		50.00	
Accounts Receivable	$2,903.60		
Less: Provision for Doubtful Accounts	214.85	2,688.75	
Notes Receivable		200.00	
Merchandise Inventory		1,842.75	
Labor in Process		279.85	$6,023.80
Fixed			
Automobiles	$900.00		
Less: Provision for Depreciation	300.00	$600.00	
Furniture and Fixtures	$750.00		
Less: Provision for Depreciation	150.00	600.00	
Tools and Equipment	$250.00		
Less: Provision for Depreciation	50.00	200.00	$1,400.00
		Total Assets,	$7,423.80

LIABILITIES

Accounts Payable	$2,507.65	
Notes Payable	500.00	
	Total Liabilities,	$3,007.65

NET WORTH

Capital Account	4,416.15
Total Liabilities and Net Worth,	$7,423.80

Fig. 1.

be seen the average percentage that has to be added to material and labor costs to cover actual overhead. Unless this is taken into consideration consistently in compiling estimates for contract bid purposes and a further additional percentage added to insure a legitimate net profit, the business cannot possibly show a healthy condition.

The Statement of Condition as outlined in Fig. 2 sets forth the amounts of the various Assets and Liabilities of the business and the Net Worth, representing the amount that the Total Assets are in excess of the Total Liabilities. The information contained in this statement is not only essential to the management of the business, but without a true Statement of Condition a contractor and dealer cannot hope to obtain a line of credit from the wholesaler nor the proper financial assistance from the bank. As will be noted, the total of the Current Assets in the present illustration is twice the amount of the Liabilities, which is commonly called a two-to-one showing and is considered the low water mark from a credit standpoint. Anything below that ratio shows very conclusively that the business is in an unhealthy condition, and the results of investigations show that in the majority of instances this condition has been due to the lack of knowledge of correct percentage of overhead. From the standpoint of the management this statement shows at a glance just how much the business has tied up in Accounts Receivable and Merchandise, and what amounts are due in Accounts Payable and Notes Payable, from which information the necessary action can be taken promptly. A comparison of this statement at the end of the period with the one at the beginning will also show the actual disposition of the Net Profit for that period.

The foregoing set of books as outlined has been found by actual practice sufficiently adequate to fit the needs of contractors and dealers doing an annual business up to $50,000. It has been designed with special attention to simplicity so that the services of a high-salaried bookkeeper are not required to operate it after the system is once properly installed. From the above statements, it is quite evident what valuable information can be obtained from the very simplest set of books to help guide the small electrical store in the right direction as to the profitable operation of the business.

However, the system is also built for expansion and it is the intention from this point to take up the proper methods to provide for departmental segregation on the books and the compilation of detailed job costs, overhead, etc. This detailed analysis has been more practically adapted to contractors and dealers with a volume of over $50,000 annually, where there are separate department heads, for instance.

PROFIT & LOSS STATEMENT
For Calendar Year Ending December 31, 1923

REVENUES

			Per Cent
Sales		$27,817.40	
Less: Returns and Allowances		162.75	
Net Sales		$27,654.65	100
Cost of Goods Sold—Material	$12,032.60		
Labor	6,512.35	18,544.95	67
Gross Profit on Sales		$ 9,109.70	33

EXPENSES

Advertising	$ 391.70		
Automobile Expense	512.45		
Depreciation	500.00		
Doubtful Accounts	250.35		
Freight, Drayage and Express	112.60		
Heat, Light and Power	105.85		
Insurance	204.70		
Interest and Discount	52.65		
Miscellaneous Expense	54.40		
Rent	600.00		
Salaries (Incl. Proprietor, $2,400)	3,300.00		
Stationery, Printing and Office Supplies	125.45		
Taxes and License	75.60		
Telephone and Telegraph	104.75		
		6,390.50	23
	Net Profit,	$2,719.20	10
Percentage of Overhead to Material & Labor Costs			34

Fig. 2.

Shall the Contractor-Dealer Sell Washing Machines?

A Clear Analysis of the Situation by an Experienced Executive Who gives Fundamental Details for Successful Dealers

By E. A. NORTON
Manager, Electrical Department, Barker Bros., Los Angeles, California

The solution to any serious problem can be found by analytical consideration of that problem and by applying the experiences of others who have been confronted with a similar problem. The knowledge of what not to do has often saved from disaster. In avoiding the wasteful effort of costly experimentation profits are derived with fewer setbacks. There are, unfortunately, still some members of the electrical industry who will take on additional burdens without hope of profit. However, the majority of contractor-dealers have arrived at the point where they will not follow this practice and where they refuse to increase volume for volume alone. The increase in volume must be accompanied by a corresponding increase in net profit.

Many electrical contractor-dealers have looked askance at the electric washing machine business. Being perhaps more familiar with wiring and construction work, they have been more attracted by that particular phase of the business and have been disposed to allow the merchandising of certain appliances to drift into other channels. The reasons for this procedure are many and varied; the net results are distressing from the point of view of electrical retailing.

A close analysis of the problem seems to present seven distinct features that must be considered by every dealer; in the order of their importance they are:

1. Is the market at hand?
2. What will be the effect on overhead?
3. Is the organization equipped to sell properly?
4. Does the line belong in the dealer's business?
5. Are the discounts sufficient?
6. Can the dealer afford to advertise?
7. Can the dealer finance time sales?

During the year 1923 approximately 565,000 electric washing machines were sold in the United States. It therefore seems difficult to conceive of a section of the country served electrically in which the demand for electric washers would not be present. Women are constantly realizing in increasing numbers and with growing force and effect the labor saving and the time saving made possible by the use of electricity in the home and particularly the value of those devices that reduce the more laborious tasks to mere mechanical processes. For that reason alone it seems that nearly every home not already equipped with an electric washer offers a sales prospect. Washing machines have been seen in use on the porch of huts occupied by the families of section hands; no home is too humble for the possession of such a device.

Hardware stores, department stores and general merchandise stores have for years carried washing machines. In the days before the electric washer these stores sold the old style hand operated machines and readily took on electrically operated washers when they were first introduced. They have continued to sell electric machines in growing volume, despite the fact that the sales forces of these dealers have generally been lacking in mechanical and technical knowledge. These dealers being usually old established firms, well acquainted with the demands of their trade, it is certain that they would not carry a line that was not subject to ready turnover.

The extensive national advertising that has been done during the past few years by manufacturers of electric washers has instilled in the mind of every woman the desire to be free from the drudgery of housekeeping and particularly to be free from the arduous task of washing. The modern housewife recognizes in the electric washer a device that will make her housework easier. The answer to the first question is, therefore, that the market is almost always at hand.

It is true that all increases in volume of business have their effect on a dealer's overhead expense. However, if this overhead is properly controlled, the addition of a single line, and particularly of electric washing machines, need not increase this expense beyond the point warranted. An analysis of the situation will show that, ordinarily, a dealer's business is self-supporting without the addition of this line. The sales and office organization is generally of sufficient size to handle increased volume without increase in personnel and the average dealer is ordinarily forced to maintain a delivery service. The addition of a line of washers, therefore, means no particular increase in these departments and consequently is not responsible for increase in overhead. On the contrary, the addition of this line often makes possible the use of otherwise unproductive time. Salesmen on such a line are usually engaged on a commission basis and consequently add nothing to overhead expense. Everything considered, therefore, the addition of a line of electric washing machines not only should not increase a dealer's overhead but may actually tend to decrease its percentage in relation to gross volume.

It is unfortunate, but nevertheless true, that many dealers have not developed organizations that are properly equipped to handle sales work. The reasons for this are varied, beginning with the fact that many dealers were originally contractors and that their greatest familiarity, therefore, is with that phase of their business. In the press of estimating and supervision they have not paid the close attention to sales work that must be devoted to the proper growth of a merchandising department. It is almost beyond reason to expect that a dealer's sales organization can be strong if he himself is not closely allied with sales work. However, there are many instances where the merchandising department is under the supervision of someone who is specially trained in the retailing of electrical appliances. Where this is the case the record of growth has nearly always been consistent and the merchandising department has contributed liberally to the general profits of the business.

The fact that a dealer's staff is not composed of merchandising specialists is no necessary drawback to the successful selling of electric washers. Manufacturers, distributors and jobbers of these appliances are constantly issuing descriptive bulletins, letters, and other forms of informative material that will, if carefully studied, give the dealer's force sufficient information to sell the equipment honestly and satisfactorily. Sales meetings held regularly by the dealer's staff and addressed by representatives of manufacturers' organizations are of inestimable help in developing the selling ability of the force and in bringing to their attention all of the salient facts of the various devices. A dealer who avails himself of all the sales assistance offered and who sees to it that his force also makes use of this aid will rapidly develop an organization that will produce a sales volume and a merchandise turnover, if his buying is properly done, that will show him attractive returns for the effort expended. The mere statement that a dealer's organization is not essentially one of salesmen is, therefore, not sufficient excuse for not handling electric washers.

Electrical appliances were found, originally, only in electric stores. The drift from this channel to that of non-electrical outlets has been occasioned by many things, not the least of which has been the indifference of the electrical dealer himself. There seems to be no reasoning process by which it could be deduced that electric washers do not belong in an electric store. They deliver a service electrically and consequently are an integral and legitimate part of the stock of every electrical dealer.

The question of margin, or discount, has occasioned almost endless discussion. The profit on all makes of washers is usually consistent with their rate of turnover. It is generally found that the device with the long discount is relatively unknown to the consumer and that the discount is given in return for promotion work not done by the manufacturer. Successful dealers in electric washers have usually built their success on the foundation of the product of a reputable manufacturer and have thereby increased their turnover and their net profit. The dealer must decide for himself whether he wants to handle a machine well advertised, made by a reliable company and backed by the standard of that factory's name, or whether he wants to sell a relatively unknown device and to sacrifice at least a part of the differential in discount in the promotion work he will be obliged to do. Generally speaking, a line on which the initial investment is relatimely small, that carries a discount sufficient to pay a reasonable sales commission, and that is made by a firm of reliable reputation, will show the dealer that he has made no mistake in decision.

No dealer in business today can afford not to advertise. His location may be the best in town, he may have the most attractive store, the greatest stocks and the best sales force, but if he does not tell the people about his store he will suffer in volume and his overhead will

continue. The amount to be devoted to this purpose must be decided by each dealer and will probably vary with the location, the line to be advertised, the time of year and the dealer's financial status. He should, however, do as much advertising as he can justify.

The financing of time sales at one time was a serious problem for the average dealer. As more attractive term payments were offered the volume of sales grew and the amount of money tied up in non-liquid assets increased. This has all been done away with. The volume of time sales is now larger than it ever was but the dealer is in a better position to handle this class of business. This has come about through the various finance companies that make a business of buying, or handling, retail sales paper. Many of the larger manufacturers have established companies for the purpose of carrying the paper on dealers' sales of their apparatus. Inasmuch as the dealer gets his money as he would on a note at the bank, he is immediately in position to put that money to work again, thereby increasing his turnover. This has been a boon to the dealer and has served to make more attractive the merchandising of such devices as electric washers.

Giving due consideration to all of the points above mentioned, there seems no legitimate reason why the electrical dealer under normal conditions should not handle electric washing machines and the various other electric labor-saving devices. It seems only logical to expect that the public will look to the electrical store for electrical devices. If not found there the public will automatically be driven to non-electrical stores and the entire tide of electric appliance merchandising may be diverted from its original and logical channel.

Ira R. Seltzer, for seven years president and general manager of the Gordon Electric Manufacturing Company, Waterville, Conn., has resigned to locate in Los Angeles, Calif., where he will represent the company. Mr. Seltzer will also distribute the lines of other manufacturers of electrical and radio materials, carrying stock sufficient to meet the demands of his trade.

State Contractors and Dealers Meeting Announced

Pleasure and Business Will Be Combined on Trip to Pit River Plant of Pacific Gas and Electric Company

The regular meeting of the California State Association of Electrical Contractors and Dealers will be held at Pit River Plant No. 1 of the Pacific Gas and Electric Company on June 28, 1924. Walter F. Price, executive secretary of the association, has made arrangements with the Southern Pacific Company for special accommodations and the entire party will travel in private cars. Those members who plan to leave from San Francisco will take the 9:20 p.m. Southern Pacific ferry on Friday evening, June 27, to Oakland Mole where they will board train No. 16. By special arrangement the private cars of the party will be attached to the end of the train. A special midnight lunch will be served, with hot coffee. The train is due at Sacramento at 1:40 a.m., June 28, and members from the Sacramento Valley may join the party at that point.

Arrival at Redding will be at 8:48 a.m., June 28, and the party will be ready to proceed immediately, breakfast being served on the train for those who so desire. Through the courtesy of R. E. Fisher, vice-president in charge of public relations and sales of the Pacific Gas and Electric Company, and through the courtesy of other officials of that company, the entire party will be the guests of Pacific Service from the time of arrival at Redding until the return to that point. Special arrangements have been made for transporting the guests by automobile from Redding to the Pit River plant where all will be quartered at the company hotel. Arrival at the Pit plant will be about 1 p.m. on June 28 and lunch will be served on arrival.

The business meeting will be held at Pit on Saturday evening, June 28. The following morning will be devoted to inspection of the plant, fishing and other sports. The party will leave by automobile for Redding on Sunday afternoon and will return to San Francisco on train No. 13, arriving at the ferry building at 8:10 a.m. Monday morning, June 30.

Accounting Problem Questions Answered by Expert

The Journal of Electricity has made arrangements with F. V. Mitchell, public accountant of San Francisco, to answer, in these columns, such questions as may be asked on accounting. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following the receipt of the inquiry.

Question:

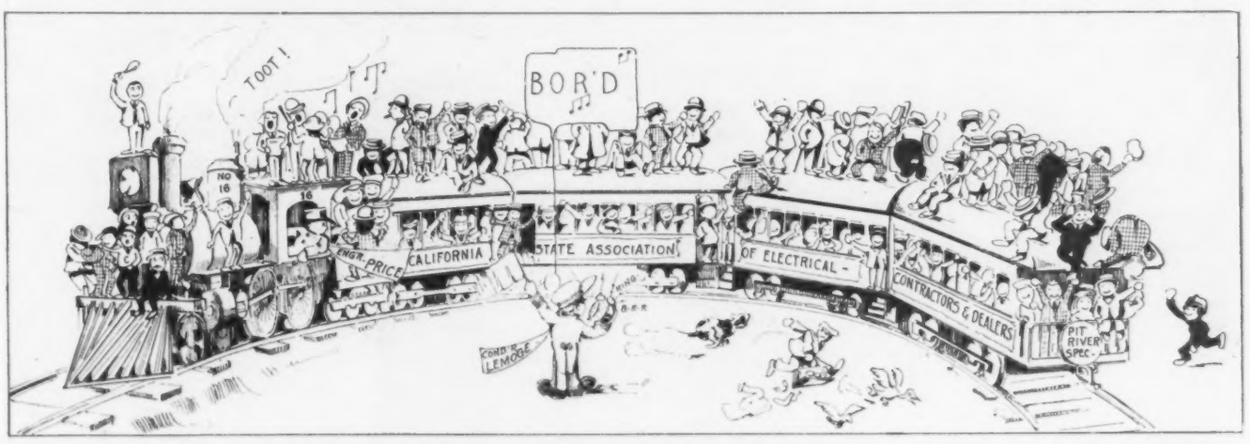
What percentage of the total yearly sales, consistent with good business practice, should be outstanding in accounts receivable?

Answer:

There should not at any time be more than 10 per cent of the amount of yearly sales outstanding in accounts receivable. This is absolutely a **maximum** percentage as it provides for the total current month's sales—1/12 of 100 per cent or 8-1/3 per cent—leaving 1-2/3 per cent of yearly sales in past due accounts.

Well Known Fixture House Joins Electrical Associations

One of the firms which recently became a member of the Electrical Contractors' and Dealers' Association and the Lighting Fixture Dealers' Association, both of Sacramento, Calif., and also of the California State Association of Electrical Contractors and Dealers, is the Thomas Day Company. The company, which designs, manufacturers and installs lighting fixtures, is one of the oldest fixture houses in the United States, having been organized in 1840. Its main factory is situated in San Francisco, Calif., with branches in Oakland and Los Angeles, Calif., Salt Lake City, Utah, and Seattle, Wash., in addition to the Sacramento branch at 1014—28th Street, which was opened in May, 1922. Two outstanding installations made by them in Sacramento are the Bank of Italy and the Masonic Temple. Fred LaPlace is resident manager for the company. He is an expert with a scientific knowledge of lighting.



The California State Association of Electrical Contractors and Dealers en route to the Pit River Plant of the Pacific Gas and Electric Company. Business, pleasure, eating and fishing are special features of the trip. Conductor Lemoge and Engineer Price are responsible for the attractive arrangements that have been made for the comfort of the party.

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By F. V. Mitchell

ALL revenue and expense accounts are closed out into capital account through Profit and Loss at the end of each closing period by journal entry, in accordance with the following illustration:

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To transfer net profit for calendar year 1923 into capital account.

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Tools and Equipment	$250.00		
Less: Provision for Depreciation	50.00	200.00	$1,400.00
		Total Assets,	$7,423.80

LIABILITIES

Accounts Payable	$2,507.65	
Notes Payable	500.00	
	Total Liabilities,	$3,007.65

NET WORTH

Capital Account	4,416.15
Total Liabilities and Net Worth,	$7,423.80

Fig. 1.

be seen the average percentage that has to be added to material and labor costs to cover actual overhead. Unless this is taken into consideration consistently in compiling estimates for contract bid purposes and a further additional percentage added to insure a legitimate net profit, the business cannot possibly show a healthy condition.

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PROFIT & LOSS STATEMENT
For Calendar Year Ending December 31, 1923

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Gross Profit on Sales		$ 9,109.70	33

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Depreciation	500.00		
Doubtful Accounts	250.35		
Freight, Drayage and Express	112.60		
Heat, Light and Power	105.85		
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Stationery, Printing and Office Supplies	125.45		
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Net Profit,		$2,719.20	10
Percentage of Overhead to Material & Labor Costs			34

Fig. 2.

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By E. A. NORTON
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It is unfortunate, but nevertheless true, that many dealers have not developed organizations that are properly equipped to handle sales work. The reasons for this are varied, beginning with the fact that many dealers were originally contractors and that their greatest familiarity, therefore, is with that phase of their business. In the press of estimating and supervision they have not paid the close attention to sales work that must be devoted to the proper growth of a merchandising department. It is almost beyond reason to expect that a dealer's sales organization can be strong if he himself is not closely allied with sales work. However, there are many instances where the merchandising department is under the supervision of someone who is specially trained in the retailing of electrical appliances. Where this is the case the record of growth has nearly always been consistent and the merchandising department has contributed liberally to the general profits of the business.

The fact that a dealer's staff is not composed of merchandising specialists is no necessary drawback to the successful selling of electric washers. Manufacturers, distributors and jobbers of these appliances are constantly issuing descriptive bulletins, letters, and other forms of informative material that will, if carefully studied, give the dealer's force sufficient information to sell the equipment honestly and satisfactorily. Sales meetings held regularly by the dealer's staff and addressed by representatives of manufacturers' organizations are of inestimable help in developing the selling ability of the force and in bringing to their attention all of the salient facts of the various devices. A dealer who avails himself of all the sales assistance offered and who sees to it that his force also makes use of this aid will rapidly develop an organization that will produce a sales volume and a merchandise turnover, if his buying is properly done, that will show him attractive returns for the effort expended. The mere statement that a dealer's organization is not essentially one of salesmen is, therefore, not sufficient excuse for not handling electric washers.

Electrical appliances were found, originally, only in electric stores. The drift from this channel to that of non-electrical outlets has been occasioned by many things, not the least of which has been the indifference of the electrical dealer himself. There seems to be no reasoning process by which it could be deduced that electric washers do not belong in an electric store. They deliver a service electrically and consequently are an integral and legitimate part of the stock of every electrical dealer.

The question of margin, or discount, has occasioned almost endless discussion. The profit on all makes of washers is usually consistent with their rate of turnover. It is generally found that the device with the long discount is relatively unknown to the consumer and that the discount is given in return for promotion work not done by the manufacturer. Successful dealers in electric washers have usually built their success on the foundation of the product of a reputable manufacturer and have thereby increased their turnover and their net profit. The dealer must decide for himself whether he wants to handle a machine well advertised, made by a reliable company and backed by the standard of that factory's name, or whether he wants to sell a relatively unknown device and to sacrifice at least a part of the differential in discount in the promotion work he will be obliged to do. Generally speaking, a line on which the initial investment is relatimely small, that carries a discount sufficient to pay a reasonable sales commission, and that is made by a firm of reliable reputation, will show the dealer that he has made no mistake in decision.

No dealer in business today can afford not to advertise. His location may be the best in town, he may have the most attractive store, the greatest stocks and the best sales force, but if he does not tell the people about his store he will suffer in volume and his overhead will

continue. The amount to be devoted to this purpose must be decided by each dealer and will probably vary with the location, the line to be advertised, the time of year and the dealer's financial status. He should, however, do as much advertising as he can justify.

The financing of time sales at one time was a serious problem for the average dealer. As more attractive term payments were offered the volume of sales grew and the amount of money tied up in non-liquid assets increased. This has all been done away with. The volume of time sales is now larger than it ever was but the dealer is in a better position to handle this class of business. This has come about through the various finance companies that make a business of buying, or handling, retail sales paper. Many of the larger manufacturers have established companies for the purpose of carrying the paper on dealers' sales of their apparatus. Inasmuch as the dealer gets his money as he would on a note at the bank, he is immediately in position to put that money to work again, thereby increasing his turnover. This has been a boon to the dealer and has served to make more attractive the merchandising of such devices as electric washers.

Giving due consideration to all of the points above mentioned, there seems no legitimate reason why the electrical dealer under normal conditions should not handle electric washing machines and the various other electric labor-saving devices. It seems only logical to expect that the public will look to the electrical store for electrical devices. If not found there the public will automatically be driven to non-electrical stores and the entire tide of electric appliance merchandising may be diverted from its original and logical channel.

Ira R. Seltzer, for seven years president and general manager of the Gordon Electric Manufacturing Company, Waterville, Conn., has resigned to locate in Los Angeles, Calif., where he will represent the company. Mr. Seltzer will also distribute the lines of other manufacturers of electrical and radio materials, carrying stock sufficient to meet the demands of his trade.

State Contractors and Dealers Meeting Announced

Pleasure and Business Will Be Combined on Trip to Pit River Plant of Pacific Gas and Electric Company

The regular meeting of the California State Association of Electrical Contractors and Dealers will be held at Pit River Plant No. 1 of the Pacific Gas and Electric Company on June 28, 1924. Walter F. Price, executive secretary of the association, has made arrangements with the Southern Pacific Company for special accommodations and the entire party will travel in private cars. Those members who plan to leave from San Francisco will take the 9:20 p.m. Southern Pacific ferry on Friday evening, June 27, to Oakland Mole where they will board train No. 16. By special arrangement the private cars of the party will be attached to the end of the train. A special midnight lunch will be served, with hot coffee. The train is due at Sacramento at 1:40 a.m., June 28, and members from the Sacramento Valley may join the party at that point.

Arrival at Redding will be at 8:48 a.m., June 28, and the party will be ready to proceed immediately, breakfast being served on the train for those who so desire. Through the courtesy of R. E. Fisher, vice-president in charge of public relations and sales of the Pacific Gas and Electric Company, and through the courtesy of other officials of that company, the entire party will be the guests of Pacific Service from the time of arrival at Redding until the return to that point. Special arrangements have been made for transporting the guests by automobile from Redding to the Pit River plant where all will be quartered at the company hotel. Arrival at the Pit plant will be about 1 p.m. on June 28 and lunch will be served on arrival.

The business meeting will be held at Pit on Saturday evening, June 28. The following morning will be devoted to inspection of the plant, fishing and other sports. The party will leave by automobile for Redding on Sunday afternoon and will return to San Francisco on train No. 13, arriving at the ferry building at 8:10 a.m. Monday morning, June 30.

Accounting Problem Questions Answered by Expert

The Journal of Electricity has made arrangements with F. V. Mitchell, public accountant of San Francisco, to answer, in these columns, such questions as may be asked on accounting. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following the receipt of the inquiry.

Question:

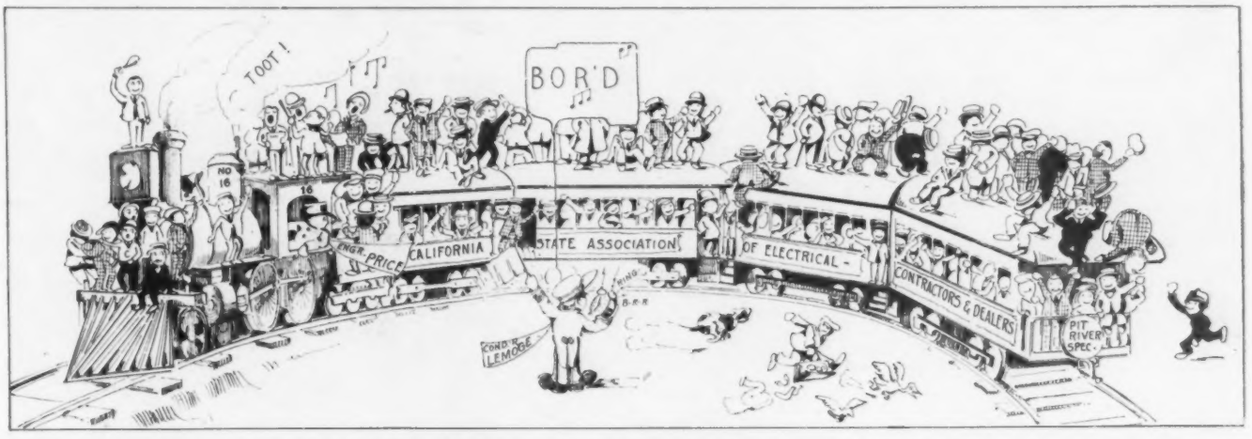
What percentage of the total yearly sales, consistent with good business practice, should be outstanding in accounts receivable?

Answer:

There should not at any time be more than 10 per cent of the amount of yearly sales outstanding in accounts receivable. This is absolutely a **maximum** percentage as it provides for the total current month's sales—1/12 of 100 per cent or 8-1/3 per cent—leaving 1-2/3 per cent of yearly sales in past due accounts.

Well Known Fixture House Joins Electrical Associations

One of the firms which recently became a member of the Electrical Contractors' and Dealers' Association and the Lighting Fixture Dealers' Association, both of Sacramento, Calif., and also of the California State Association of Electrical Contractors and Dealers, is the Thomas Day Company. The company, which designs, manufacturers and installs lighting fixtures, is one of the oldest fixture houses in the United States, having been organized in 1840. Its main factory is situated in San Francisco, Calif., with branches in Oakland and Los Angeles, Calif., Salt Lake City, Utah, and Seattle, Wash., in addition to the Sacramento branch at 1014—28th Street, which was opened in May, 1922. Two outstanding installations made by them in Sacramento are the Bank of Italy and the Masonic Temple. Fred LaPlace is resident manager for the company. He is an expert with a scientific knowledge of lighting.



The California State Association of Electrical Contractors and Dealers en route to the Pit River Plant of the Pacific Gas and Electric Company. Business, pleasure, eating and fishing are special features of the trip. Conductor Lemoge and Engineer Price are responsible for the attractive arrangements that have been made for the comfort of the party.

JOBBER, DEALER AND SALES AGENT

Making the Fixture Display Room More Efficient

Portland Contractor-Dealer Installs Novel Control Switches as Aid to Lighting Fixture Salesmen

The amount of business that the customer transacts with the dealer depends to a large extent upon the impression that the salesman makes. Likewise the impression that the salesman makes on the customer is affected to a great extent by his knowledge of his stock. Thus it is to the advantage of the dealer to see that his representatives that meet the public are prepared to answer any and all questions in relation to the merchandise they have to offer.

Knowledge of the stock of the electrical concern is particularly needed by the salesman working inside of the establishment. Outside salesmen supplied with samples, catalogs and price books have in most cases become acquainted with the line handled before going out to sell. It is the new inside salesman that the store manager must educate.

The electrical dealer handling fixtures has found that this class of trade is particularly anxious to have someone conversant with the various types ready to meet the customer. The prospect expects to make quite an expenditure and feels that a certain amount of deference should be shown to him. If a salesman, not particularly well acquainted with the fixture line of the company, is permitted to grope around the various fixtures and show that he is not familiar with the type or price of the unit, the prospective customer is likely to become disgusted and either leave the store or demand that the head of the firm be called to show the fixtures.

In either case the concern loses money because the manager cannot afford to leave his other business every time a fixture customer enters the store. Also, if the firm carries a large line of fixtures it is probable that the manager is not in a position to know the prices of the entire line. The result is that the customer feels that there is no one that is well acquainted with the company's line of fixtures.

To overcome any tendency such as this, E. L. Knight of E. L. Knight & Company, Portland, Ore., has so arranged the company's fixture display that the most inexperienced salesman can give the customer absolute satisfaction. In addition to placing the salesman in a position to accurately serve and answer the questions of his customers, the system installed by E. L. Knight & Company has expedited the handling of lighting fixture customers.

All of the fixtures handled by the Portland contractor-dealer are hung in the rear of the company's store. Comfortable chairs are provided for customers and rugs have been placed on the floor to make the display room more attractive to the eye. Fixtures are hung from the ceiling and from the side walls in the same manner that they will be in the prospect's home and each fixture is wired to a separate wall switch.

These switches have been grouped in gangs of five, the plates being placed on the pillars supporting the colonnades of the ceiling. Brushed brass plates, which have been made considerably wider than the regular five-gang plates, have been used by the Knight company. These plates have been stamped out on the right side so that small cards can be inserted opposite the control buttons on the switches. Each card carries the name of the fixture, type and location for which it is suited and the price of the unit. The switches are so arranged that the salesman has only to look at the panel and he can tell immediately which switch controls any particular fixture that the customer desires to have illuminated.

The entire wiring layout for the store was designed by Mr. Knight and the plan of hanging the fixtures in banks was accepted before any of the wiring was installed. In this way switches for a certain bank of lights are mounted in each pillar and the control of the lights is greatly facilitated. As each fixture is controlled by a separate switch it is not necessary for the customer to attempt to visualize how the particular fixture would appear if it were the only one illuminated. If, however, the client desires to see how a center fixture blends with various bracket fixtures, it is only necessary for the salesman to switch these on from other pillars.

By using this system of switches, equipped with the indicating cards, any salesman of the company can be pressed into service as a skilled fixture salesman. As the salesman can readily secure the information concerning any fixture directly from the card at the right of the switch, he can show a number of fixtures to a prospect in a minimum of time, thus reducing the amount of time that has to be taken by both customer and salesman.

The cards that are attached to the switches have also been found to assist the company in keeping its display in attractive shape. As all of the necessary information regarding the fixture is contained on the card it is not necessary to attach unsightly price cards directly to the fixture. These pillars have been so located that they tend to make rooms of the various parts of the store but do this without shutting the different sections off from the main show room. Thus the impression of roominess is maintained and the semi-privacy of the departments is also secured.

Fixture display department of E. L. Knight & Company, Portland, Ore.

They Tried It and Succeeded — You Can Do It Too

St. Louis Electrical Dealers Turn Local Street Car System into Sales Producing Medium for New Washing Machine

In every city or town there is some distinctive characteristic that can be capitalized upon by the merchant anxious to stimulate business. The discovery of the characteristic that can be put to use by the dealer is the first and most difficult problem that must be solved. Ingenuity and imagination are necessary as these things are present in all progressive sales work.

By turning the commonplace activities of his city into channels that can be of commercial benefit to his business, many a merchant has added appreciably to his annual sales total. Careful planning and equally careful execution of the plans have been largely responsible for the success of the projects.

In other cases it has been necessary for the dealer, who desires to employ some new sales producing idea, to import an activity from some other town in order that the novel stunt might be put before the public. The results, however, have in most cases been the same, whether the merchant turns some local activity to his service, or goes to some outside territory to secure the plan for his campaign.

A sales producing campaign which could be easily adapted to any city in which there is a street car system, or where motor trucks could take the place of the street car, was recently conducted by two electrical dealers of St. Louis, Mo. These dealers agreed to cooperate in announcing the arrival, in St. Louis, of the new Western Electric washer.

The men in charge of the two electrical establishments knew that whenever any celebrity visited St. Louis, the guest was met by a citizens' committee and escorted around the city in a handsomely equipped parlor street car. These cars are well known by the people of that city and the citizens have naturally connected them with the special occasions on which they have been used. The cars are fitted with luxurious chairs, handsome hangings and thick rugs on the floor. As a result it has been the desire of many residents of St. Louis to have an opportunity to ride in one of the cars.

That the parlor cars of St. Louis could be turned to the use of Frank Adam and The Electric Shops, Inc., was agreed upon by the managers of the two electrical establishments and preparations were made to secure the use of the parlor cars to herald the arrival of the new washing machine. Arrangements were made with the street car company to furnish the cars which were to be routed around the city.

Prior to the arrival of the new washing machines, teaser advertisements were run in the daily papers asking "What's Coming?—In Special Parlor Cars—Next Week." No mention was made as to what was to be presented in the parlor cars until the day that the cars, decorated with bunting and carrying banners announcing the arrival of the new washer, appeared upon the streets. Women were invited to ride on the cars free and it was announced that the car would return the passengers to the spot from which they started. The cars were definitely routed around the town in loops so that the women visitors might be returned to their homes.

Each car was so equipped that the demonstrators could easily display the outstanding features of the clothes washer to all who came aboard the car. To give the visitors an idea as to just how the washer actually operated a real washing was done on each car.

Window displays and advertisements were used to tie in with the demonstrator "stunt." Exceptional care was taken by both Frank Adam and The Electric Shops, Inc., in preparing feature windows for the campaign and excellent results were achieved. Folders, posters and other forms of publicity were also used to attract attention to the fact that the Western Electric washer had arrived in St. Louis.

Direct and indirect results were reported by the two dealers following the announcement of the new washer. Sales were closed during the period that the cars were used and a long list of prospects was secured by having each woman that boarded the cars register her name and address.

Women were invited to ride free on the parlor cars that carried the new washer. When they entered they were invited to register their names and addresses.

The mobilized demonstration presented by the St. Louis dealers brought forward an idea that nearly any dealer could put to use in his own town. The parlor car, recognized as an asset in the campaign, is not the only thing that could have been used. Other dealers have put displays upon motor trucks and have toured their cities with these and there is no reason why actual demonstrations could not be made on a motor truck as well as on the parlor car. Visitors could be invited to ride on either vehicle.

The Frank Adam Electric Company and The Electric Shops, Inc., prepared feature window displays to tie in with the parlor car demonstrations.

INDUSTRIAL NEWS

Puget Sound Utility Pays Street Railway Tax Under Protest

To prevent the sale of over two million dollars' worth of its property, seized on May 23 to force payment of 1919 street railway taxes, the Puget Sound Power & Light Company, Seattle, Wash., on June 7 paid, under protest, a total of $655,294.20 to W. W. Shields, treasurer of King County. The amount paid by the Puget Sound company includes the 1919 tax together with interest at 15 per cent since March 15, 1920.

In making the payment the company stated that the protest was made pending the final outcome of the company's fight against the City of Seattle to force the city to pay three-fourths of the tax, as the city agreed to do in the original purchase contract. By paying the taxes and accrued interest the Puget Sound Power & Light Company has brought to an end the fight between it and King County officials.

Prior to paying the tax the Puget Sound company and the Old Colony Trust Company, a large holder of the former company's bonds, applied to the Federal Court in Seattle for temporary injunctions restraining the King County sheriff from selling the power company's holding to satisfy the 1919 tax. Three judges took the matter under advisement on June 2 after hearing the details of the purchase by the city of the street railway system and the court proceedings subsequent to the purchase. On June 5 the judges handed down a decision holding that the tax was due and delinquent and that under the state law the county officials were required to distrain personal property to secure payment. The court dismissed the application of the two corporations stating that it had no jurisdiction in the case of the Old Colony Trust Company and that the Puget Sound Power & Light Company has an adequate remedy at law.

Temporary Rate Increase Asked by Edison Company

The Southern California Edison Company has filed an application with the California Railroad Commission for authority to file and make effective from July 1, 1924, to March 31, 1925, inclusive, new rate schedules providing emergency increases over the present rates. The proposed rates would produce approximately $3,000,000 more revenue for the given period, than the present rates.

The application is necessitated, the company claims, by the present deficiency of the water supply available to its hydroelectric plants during the current year of 1924, which is, and will be, the lowest of which any accurate record exists, with the result that the company's production expenses will be approximately $5,568,000 greater than they would be if 1924 were an average water year. According to the application the company, due to shortage of water, will be required to operate its steam generated electric plants, incurring the purchase of large quantities of fuel oil, and will also be required to purchase large amounts of electric energy to supplement its available supply.

The company sets forth also that the deficiency in the contingency reserve at the end of 1924 will be approximately $4,045,000, which deficiency will leave the company far short of a fair return for the year 1924, and is too great, it is alleged, to be overcome by possible credits to contingency reserve in the years immediately following 1924.

California Power Situation Is Subject of Meeting

To consider the question of the institution by the California Railroad Commission of an investigation into the operation of electric utilities in the state during the present emergency resulting from abnormally low precipitation a public hearing was scheduled for June 13. Notice of the hearing was forwarded to eight power companies in southern California and to nine cities operating municipal plants.

The question as to whether there will be an actual shortage is still somewhat doubtful, although present indications are that some shortage can hardly be avoided. Unless fall rains are later and lighter than usual the amount of this shortage will not exceed a few per cent for the remainder of the year. The purpose of the commission's investigation is to enable it to require the most efficient distribution of the power available and to require that any curtailment that may be necessary be spread as fairly as possible.

Telephone Company Entertains Rocky Mountain Electrical League.—Members of the Rocky Mountain Electrical Cooperative League of Salt Lake City, Utah, were guests of the Mountain States Telephone & Telegraph Company at its Wasatch Exchange in Salt Lake City on the evening of May 15. A large number of electrical people were present. The visitors were shown through the building by officials of the telephone company who acted as guides, and various demonstrations were given showing the use of the telephone apparatus and equipment, one of particular interest being that showing the operation of the switchboard. The Mountain States Telephone & Telegraph Company has recently become a member of the League.

Discuss Bone and Erickson Bills at Spokane Meeting

Arguments in favor of Bone and Erickson power bills were refuted at the June 2 meeting of the Associated Industries of Spokane, Wash., by John B. Fisken, consulting engineer of The Washington Water Power Company. The arguments in favor of the bills were presented to the association on the previous week by George Nixon of the Nixon-Kimmel Company, electrical contractor-dealer of that city. Mr. Nixon has been the leading proponent of this legislation in Spokane.

Mr. Fisken called attention to the vicious elements of the proposed bills, emphasizing particularly the fact that the operation of municipal plants does not bring about general rate reductions, and also exploding the idea that cost of power is the controlling element in the location of large new industries. Mr. Fisken's experience of over thirty years in The Washington Water Power Company, and his many activities in association work have qualified him in an exceptional manner to discuss the broad questions of private vs. public ownership of utilities. His discussion of the Bone and Erickson bills was well received by the Associated Industries.

Lester N. Livengood of the Taxpayers' Economy League supplemented Mr. Fisken's statements with an exposition of the effect upon taxpayers of the removal of the tremendous investment of the present public utilities from the general taxrolls.

Manufacturer Publishes History.—The Westinghouse Electric & Manufacturing Company has recently published an attractive twenty-four page book entitled "Forty Years Ago." The book presents a brief account of the history and accomplishments of the Westinghouse Company since its entrance into the electrical industry on May 20, 1884, when George Westinghouse and H. H. Westinghouse, his brother, engaged William Stanley, the young engineer who had invented a self-regulating dynamo for lighting service. The illustrations in the publication show the evolution of many of the present day electrical devices.

Alaska Permit Sought.—John Hovaland of Hyder, Alaska, has applied to the Federal Power Commission for a preliminary permit covering a project on Fish Creek. An active mining district recently has developed in the vicinity of Hyder and the power is intended for use in connection with mining operations. This is the third power project to come before the commission from the Hyder area. In the two other cases, preliminary permits already have been issued.

License Is Issued to Columbia Valley Power Company

The Federal Power Commission has authorized the issuance of a license to the Columbia Valley Power Company covering two proposed developments in the Deschutes River in central Oregon. Various conditions, however, are attached to the license. A preliminary permit covering the two sites was issued to this company on Feb. 6, 1923.

The license covers the construction at the Pelton site of a masonry dam 185 ft. high at which 51,000 hp. will be developed. The company furnished satisfactory plans for the proposed structure. At the Metolius site, the other one involved, which is eight miles above Pelton, it is proposed to construct a dam 330 ft. high. The detailed plans for this development have not been worked out but the applicant proposes to prepare them during the construction of the Pelton development.

The Columbia Valley company sets forth in its application that a portion of the power it will develop probably will be sold to the two public utility companies operating in Portland. It is stated that within five years these utilities will have to have 40,00 hp. additional. Power can be developed, it is stated, on the Deschutes River cheaper than at sites controlled by the utility companies on the Clackamas River in Oregon and on the Lewis River in Washington. The company also advises the Federal Power Commission that other markets for power have been investigated and the opinion is expressed that the full output of the Pelton plant can be utilized on its completion and that the construction work will have to go ahead immediately on the Metolius plant.

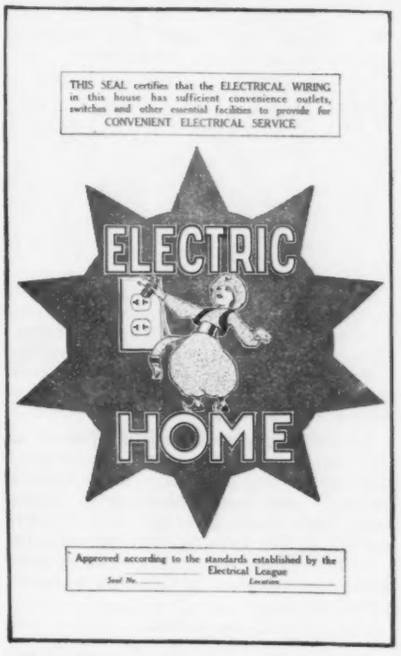
The chief engineer of the power commission in recommending a license said that the company had shown such diligence in carrying out the provisions of its preliminary permit, and in investigating the market for its power that the license sought should be granted promptly. The conditions of the licenses are: plans for the Metolius development and transmission lines are to be submitted whenever called for; logways are to be installed when requested to do so by the Secretary of the Interior; the right to use water for power purposes is to be subordinate to the requirements for irrigation in the upper valley. There was a further minor condition with regard to furnishing power at certain rates to the Warm Springs Indian Agency.

Red Seal Campaign Is Announced by National Society

In an effort to see that every home is adequately wired, The Society for Electrical Development displayed for the first time, at the last annual convention of the National Electric Light Association, what is to be known as the Red Seal plan. The Red Seal campaign is projected for a national campaign and is designed to be used in communities where electric homes have been exhibited to the public.

The plan calls for the placing of the Red Seal poster on any home that, according to the wording on the poster, "has sufficient convenience outlets, switches and other essential facilities to provide for Convenient Electrical Service." The poster is to be awarded by the local electrical organization. The Red Seal is essentially the same as the one initiated and used by the Electric Service League of Toronto, the rights to the plan having been acquired by The Society for Electrical Development.

According to the new owner of the copyrighted seal, the plan calls for "a cooperative local advertising and selling campaign, to acquaint the public with the Red Seal, also specialized advertising directed to architects, building contractors, real estate men, home owners and others to explain the advantages of adequate wiring and the meaning of Red Seal approval."


THIS SEAL certifies that the ELECTRICAL WIRING in this house has sufficient convenience outlets, switches and other essential facilities to provide for CONVENIENT ELECTRICAL SERVICE
ELECTRIC
HOME
Approved according to the standards established by the Electrical League
Seal No.
Location

Miniature reproduction of Red Seal poster. The original poster is printed in red and black with the seal appearing in red.

The posters will be supplied to the local electrical associations and are to be imprinted with the name of the league approving the installation. The material that The Society for Electrical Development will furnish, at nominal charge, includes: a manual on how to organize the campaign; Red Seal signs, for the outside of the house; Red Seal labels, for permanently attaching to the meter box; Red Seal certificates, documentary evidence to be used by builder or owner when offering house for sale; Red Seal advertisements; Red Seal form letters; Red Seal window trims; Red Seal poster stamps and other supplementary publicity.

Misstatement in June 1 Issue Corrected.—An obvious error in the preliminary announcement of the program of the World Power Conference as issued by the American Committee was copied in the June 1 issue of the Journal of Electricity. The program credited W. A. Doble as being chief engineer of the Pelton Water Wheel Company. Mr. Doble is in no way connected with that concern but carries on a consulting practice in San Francisco.

California Oregon Starts Work on Copco No. 2 Plant

Construction work on the new Copco No. 2 hydroelectric plant of The California Oregon Power Company on the Klamath River in northern California has been started and it is expected to have the plant completed and in operation by April, 1925. The plant will be practically a duplicate of Copco No. 1 and will contain two vertical hydraulic turbines operating under a head of 166 ft., each driving a 15,000-kva. generator. The development will consist of a power house, small concrete diversion dam and combination tunnel and flow line. The diversion dam will be located about 1,000 ft. downstream from the present plant and the new plant in turn about a mile farther down the river.

A 110,000-volt transmission line 82 miles in length will be built from the plant to Delta, Calif., where it will connect with a line of the same voltage to be built by the Pacific Gas and Electric Company to carry the power to Cottonwood, a distance of 43 miles more. Wooden pole structures spaced about 600 ft. apart will be used in the line which will be a single circuit transmission line with 250,000-cir. mil conductors having a capacity of 40,000 kw.

The California Railroad Commission has approved a 25-year agreement under which the entire output of the plant will be sold to the Pacific Gas and Electric Company. The contract specifies the delivery of 20,000 kw. with a monthly load factor of 70 per cent.

Members Sought by Society for Electrical Development

A broadside, designed to inform prospective members of The Society for Electrical Development of the advantages of membership in the organization, has recently been sent out to a selected list of companies that are not members. The broadside tells of the advantages of increasing the demand for electrical devices by means of cooperative advertising and shows how each branch of the industry gains from the work of the society.

The service given by the society in 1923 is reviewed and there is also a brief description of the material that is provided for use of members of the organization. A blank, permitting companies to subscribe to membership or to make either a general subscription or commodity subscription, is part of the broadside.

San Francisco Public Utility Commission Recommended.—A charter amendment providing for the creation of a Public Utility Commission to direct the operation of all properties owned by the City of San Francisco engaged in "furnishing water, light, heat, power, transportation, communication and other service of a public utility character" was introduced to the San Francisco Board of Supervisors on June 2 by Ralph McLeran, chairman of the finance committee of the board. An amendment of similar character was rejected by San Francisco voters at the last general election. The proposed legislation provides for the appointment by the mayor of a board of five public utility directors who shall be approved by the Board of Supervisors.

Plans for Pacific Coast A.I.E.E Convention Announced

Tentative plans for the annual Pacific Coast convention of the American Institute of Electrical Engineers to be held at Pasadena, Calif., Oct. 13-20, 1924, were made at a recent meeting of the convention committee of that body. The preliminary draft of the program is as follows: Monday morning, registration and opening ceremonies; afternoon, transmission papers, F. G. Baum, presiding; Tuesday morning, distribution papers, C. A. Heinze, presiding; afternoon, utilization papers, E. E. F. Creighton, presiding; Wednesday morning, papers on generation and machinery, H. M. Hobart, presiding; afternoon, research and electro-physics, Prof. R. W. Sorensen, presiding; evening, an address by Dr. R. A. Millikan; Thursday morning, telephony and telegraphy, A. H. Griswold, presiding; afternoon, golf and recreation, and later in the afternoon the start will be made to Mount Wilson, where the guests will have an opportunity to see the apparatus of the Carnegie Institute in action; Friday morning, automobile trips; afternoon, miscellaneous papers, L. W. W. Morrow, presiding; evening, Edison banquet; Saturday will be devoted to special trips to points of engineering and general interest.

The larger part of the papers to be presented at the sessions will be furnished by the papers committee for the Pacific Coast convention, and the balance will be supplied by the national meeting and papers committee. Fifteen papers have already been secured by the Pacific Coast committee. The convention will be held at the Huntington Hotel at Pasadena. Prof. R. W. Sorensen, of the California Institute of Technology, is general convention chairman, and J. E. MacDonald, of Los Angeles, is chairman of the papers committee.

Utah Company Adding 20,000-kw. Unit to Jordan Plant

Work on the addition to the Utah Power & Light Company's Jordan steam plant, in Salt Lake City, Utah, is progressing rapidly, and it is expected that the enlarged plant will be ready for operation by the end of this year. This project involves the expenditure of approximately $2,000,000. When completed it will mean the addition of 20,000 kw. to the installed capacity of this steam-electric generating station. With its present capacity of 15,000 kw. this means that the plant will be capable of producing about 45,000 kw. of electrical energy.

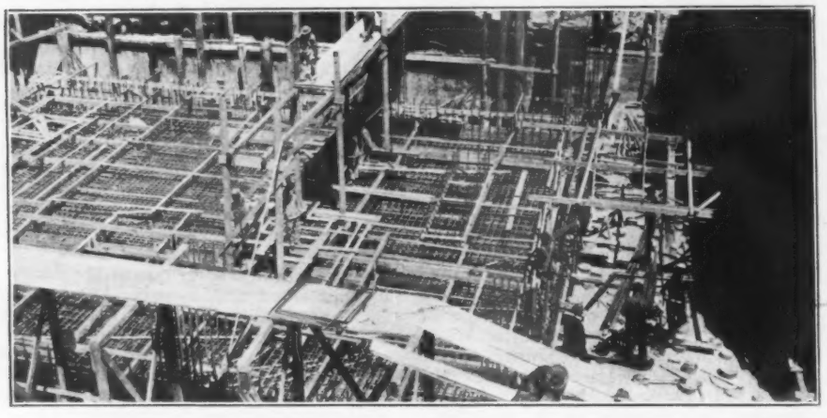
The new unit will be a 20,000-kw. turbo-generator, direct connected and weighing 515,000 lb. The 9-stage Curtis turbine will be fed from a 16-in. steam header from the pressure boiler plant. The exhaust steam from the turbine will be passed through a surface condenser containing 6,088 1-in. tubes. Each tube is 19 ft. long. The combined length of the tubes for the condenser is 115,672 linear ft., or approximately 24½ miles. This unit will condense 230,000 lb. of steam per hour.

The condenser circulating water is pumped from the intake flume by means of two 38-in. pumps pulling 1,900 gal. per minute. Each is driven by a 150-hp. motor. The condensate from the condenser is returned to the boiler feed water system by means of two pumps, each of which will handle 250,000 lb. of condensate per hour. Each pump is driven by a 50-hp. motor.

In addition to this equipment there is a great deal of smaller auxiliary equipment, including an oil filtration system, piping and gages and indicating devices, besides the necessary electrical equipment, including buses, switches and control apparatus.

All of the generating equipment of the old plant is being thoroughly overhauled and necessary replacements made. Underfeed stokers with forced draft have been installed and the capacity of the boilers thus greatly increased. Their ratings have been more than doubled, thus avoiding new boiler installations.

Public Land Owners Cannot Eject Transmission Line Companies.—Patentees of public lands across which power transmission lines have been constructed under authority and regulations of the Secretary of the Interior cannot eject the corporation owning such lines from the land, according to a decision of the United States Supreme Court, in an opinion by Justice Butler. The decision upholds the authority of the Secretary of the Interior to make reservations in granting patents to homestead entries. The case was that of the Washington Water Power Company against John Swendig and others, the decision of the lower courts being affirmed.



Placing reinforcing steel and conduit for concrete mat for new 20,000-kw. steam unit at Jordan plant of Utah Power & Light Company.

New Golf Trophy to Be Awarded at P.C.E.A. Convention

A new golf trophy, to be played for at the annual conventions of the Pacific Coast Electrical Association, has just been donated to the association by The Pelton Water Wheel Company of San Francisco. The trophy is in the form of a cup measuring nearly two feet in height, including an ebony base. It is of simple design, silver plated and provided with suitable inscription, including place for the winner's name, a three-time win giving permanent possession of the cup.

New golf trophy presented to the Pacific Coast Electrical Association by The Pelton Water Wheel Company.

It has been agreed that the Byllesby cup, which has been the subject of competition for years, will be played for by registered members and guests whose club handicap is 18 or less. Those whose handicap is in excess of 18 will be eligible to win the Pelton cup under the same conditions. The Pelton cup is offered in memory of Lester A. Pelton, inventor of the Pelton water wheel and founder of The Pelton Water Wheel Company.

Trophy Donated to Seattle Electric Club Golfers.—Plans for a golf tournament to be held at Jefferson Park course, Seattle, Wash., under the auspices of the Seattle Electric Club, are being perfected by Harry J. Martin of the National Carbon Company, president of the club, and J. C. Zanker and R. C. Buckles of the Westinghouse Lamp Company. Three prizes will be awarded, the major prize, the president's cup, to be donated by Mr. Martin. Between fifty and sixty men of the electrical fraternity in Seattle, including jobbers, manufacturers' representatives and central station men, are expected to play in the tournament. Date for starting play will be set at an early meeting.

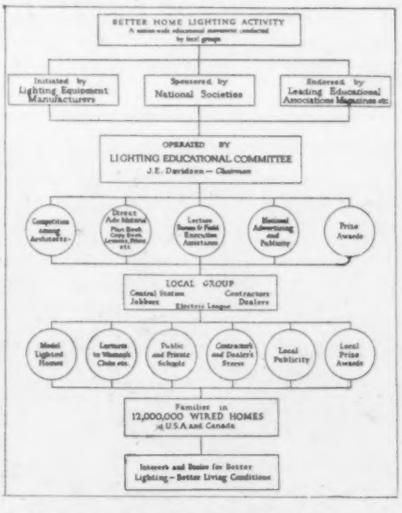
Northwest Telephone Companies Win Point in Rate Case

The Pacific Telephone & Telegraph Company and the Home Telephone Company, according to a recent ruling of the United States Supreme Court, recently won a point in their fight to raise telephone rates in Seattle, Tacoma and Spokane. The Supreme Court ruled, in effect, that the companies have the right to go into the federal courts and sue for an injunction which would restrain the State Department of Public Works from interfering with their rate-raising program, thus reversing Federal District Judge E. E. Cushman.

Judge Cushman held a bill of complaint, in which the companies asked for the injunction, could not be taken into the federal court until the companies had exhausted all legal resources in the state courts. The companies had initiated no action in the state court. Chief Justice Taft's opinion said the lower court had erred in denying the temporary injunction and had ruled improperly that the bill of complaint by the companies was premature, adding that the merits of the issue could be developed in the District Court, to which proceedings were remanded. The companies assert they are losing $700 to $3,000 a day, respectively, through the refusal to permit higher rates.

Formulating Plans for Lighting Educational Campaign

Plans are now well forward for the Lighting Educational Campaign, which consists of a national contest among architects for the design of three types of model houses and an essay contest among school children. The purpose of the campaign is to sell the public on the desirability of re-lighting the 12,000,000 homes in this country and Canada, which now enjoy electric service. The necessity for this work is


BETTER HOME LIGHTING ACTIVITY
Initiated by Lighting Equipment Manufacturers
Sponsored by National Societies
Endorsed by Leading Educational Associations Magazines etc
OPERATED BY
LIGHTING EDUCATIONAL COMMITTEE
J.E. Davidson — Chairman
Competition among Architects
Direct Ads Material Floor Stock Copy Form Lantern Slides etc
Lecture Bureau & Field Executive Assistants
National Advertising and Publicity
Prize Awards
LOCAL GROUP
Central Station Jobbers
Contractors Dealers
Electric League
Model Lighted Homes
Lectures to Women's Clubs etc
Public and Private Schools
Contractors' and Dealers' Stores
Local Publicity
Local Prize Awards
Families in 12,000,000 WIRED HOMES of U.S.A. and Canada
Interest and Desire for Better Lighting—Better Living Conditions

Organization chart for Lighting Educational Campaign.

shown by studies which have proved that the average home is less than 50 per cent adequately lighted. While the essay contest, which is to be conducted among school children, will probably not be launched until the fall, there is a tremendous amount of organization work yet to be done in order to make the compaign most effective, according to The Society for Electrical Development.

The National Electric Light Association, National Council Lighting Fixture Manufacturers, the Lighting Fixture Dealers' Society of America, Association of Electragists, International, The Society for Electrical Development, Electrical Supply Jobbers' Association and other electrical organizations will be delegated certain parts of the work. The National Eyesight Conservation Council, the National Education Association and other organizations outside the electrical industry are keenly interested in the work and have promised their cooperation.

The work will be financed by the lighting equipment manufacturers and fixture interests. Committees will be organized locally under the direction of a territorial supervisor and it is hoped to interest every incorporated city, town and village. A special committee, known as the Lighting Educational Committee, has been set up temporarily to take care of the organization of the campaign. An agency has been appointed to handle the national magazine advertising and The Society for Electrical Development will take care of the publicity through national media and local newspapers.

Canadian Company Proposes Dam for Kootenay Lake Site

The West Kootenay Power & Light Company, Ltd., Rossland, B. C., has made an application to the Canadian Provincial Government water power branch for authority to raise the low-water level of Kootenay Lake 6 ft. and thereby impound 678,500 acre-feet. The plans submitted by the company provide for a dam, situated at Granite, with a movable crest that can be hoisted on piers, whereby the high-water level of the lake will not be affected. The proposed dam would be 1,200 ft. long.

The company has had in operation for some years a 20,000-kw. hydroelectric plant at Upper Bonnington and has under construction a plant of similar capacity at Lower Bonnington. By raising the level of Kootenay Lake 6 ft. the capacity of these plants can be practically doubled.

The need for this increased power is due to the demand made on the company by the Consolidated Mining & Smelting Company of Canada, which on account of the shortage of power at its smelter, at Trail, is shipping zinc concentrate at the rate of 100,000 tons per year to Antwerp for treatment. Large quantities of lead bullion and copper matte are being shipped to Europe for treatment for the same reason. For some time the company has been experimenting on a process for the electrical smelting of copper concentrate.

Coffin Medal for 1923 Is Awarded.—The Public Service Company of Northern Illinois was awarded the Charles A. Coffin Medal for 1923 on May 21 at the annual convention of the National Electric Light Association. The winner is credited as having made, during 1923, "the greatest contribution towards increasing the advantages of the use of electric light and power for the convenience and well-being of the public and the benefit of the industry." The award was made to the Southern California Edison Company last year.

Edison Company Checks Output of Distribution Department

For computing the man-month output or the cost of work per man per month the department of budget and expenditure of the Southern California Edison Company has installed a system that determines the efficiency of the distribution department of that company. The system as adopted by the company is designed only for the distribution department because of the nature of the work of that department, the work being mostly of a routine character.

In showing the efficiency of the men in the distribution department the gang foreman's weekly report is made to cover each gang as a unit. Man-days are shown according to the number of hours worked, based on an 8-hr. day constituting one man-day and 26 man-days constituting a man-month. The field clerk on the gang makes out a report which is turned in each week with the following information: man-days, labor, superintendence, automobile cost, supply, transportation and tool expense. A monthly comparison is made of the following: total cost of work, the number of man-months, man-month output, labor cost, and the per cent of labor to the total cost.

Rules of procedure have been adopted by the company in order to keep all reports on a comparative basis. A few of the rules are as follows: The man-days of a member of a gang, going to work in some other gang, even but for a portion of a day, must be dropped from the gang he leaves. The man-days of a man coming to a gang from another gang must be shown. Where two or more gangs work on the same job the gang which accounts for the material must carry the man-days for that job. The man-days of a man working overtime on trouble separately from his gang must not be shown. The rule in comparing records of the various gangs is that each gang is working against its past record.

According to the May issue of "Edison Facts" the results of the analysis "are gratifying from the viewpoint of comparison. . . . The number of gangs had been increased 20 per cent, which meant the absorption of new life into the organization. Even with this increase it was found possible to make an effective showing through an increase in the man-month output of 8.86 per cent, a decrease in cost of labor of 3.55 per cent, and an increase in the average wage in the field of 2.61 per cent. This record was made last year in the face of rush construction, due to the unusual amount of new business and also to an extensive reconstruction program, necessitated by changes to conform with the new state law."

One Application for California Hydroelectric Development Received.—Only one application of any magnitude for appropriation of water for hydroelectric development was filed during May, 1924, with the Division of Water Rights of the California Department of Public Works. This was presented by the Bear River Water & Power Company, Auburn, Calif., and asked for 250 sec.-ft. and 100,000 acre-feet per annum from Bear River, in Placer and Nevada Counties, to develop 42,994 hp. There were no permits issued during May by the department for water for power development.

Commission Fixes New Rates for Idaho Power Company

Valuation of properties and establishing of new rate schedules, including a schedule covering the sale of "surplus power," of the Idaho Power Company have been the subjects of recent orders of the Public Utilities Commission of the State of Idaho.

The commission has fixed new schedules of rates in the following classifications: commercial lighting, high voltage power, medium voltage power, low voltage power and commercial cooking and heating. The new rates provide for a five per cent discount on contracts of not less than five years' duration and ten per cent discount on contracts of not less than ten years' duration. The company is required to render to the commission monthly reports of revenues derived from each schedule for the purpose of furnishing the commission a basis upon which to judge the adequacy of the rates over a period of time. By a recent order of the commission, the company is required to bill all customers receiving service under the above schedules, and in addition, under its municipal incandescent street lighting schedule, for ten months from March 1, 1924, or until further order of the commission, on the basis of the rate applying to ten-year contracts, regardless of whether or not such contract has been made with the customer.

In connection with the fixing of these schedules, the commission has proposed a new rate to be known as an "off peak rate," providing for the utilization of the surplus power of the company as such power is found to exist. The commission has found that during the months of October to April, inclusive, the company has available surplus power at most of its generating plants, and surplus transmission, transformation and distribution capacities at various places. The suggested rate provides for serving loads of not less than 30 hp., based on a 15-minute maximum demand during the month, in return for a payment of $1 per month per contract hp., entitling the customer to 50 kw-hr. per contract hp., and the payment of 1 cent per kw-hr. for all excess consumption. The schedule provides for delinquent payment penalties, and a special load factor discount for load factors in excess of 30 per cent.

"Surplus power" is defined as being "such power as can be supplied and delivered without additional investment by the company from equipment already in service and for which there is no demand under other rates in this tariff." The application of the schedule, the point of delivery of the power, the point of measurement of the power, the term of contract and the obligation to furnish service are all defined, and the salient features of these definitions may be summed up by saying that the company must furnish surplus power at this rate only when and where it is available, from the nearest existing circuit; the customer being required to build and maintain his own connection to such circuit.

Seattle Council Asked to Appropriate Funds for Extensions.—J. D. Ross, superintendent of the Seattle (Wash.) municipal light department, has asked the city council to appropriate sums aggregating $445,000 from the city light fund to take care of new business. Mr. Ross asks $300,000 to build extensions to supply new customers in the residence districts; $20,000 to enlarge the street lighting system; $75,000 for new underground conduits; and $50,000 to construct extensions to shops and stores in the business section. Mr. Ross also recommended the sale of $1,000,000 worth of city light bonds, most of the money to be spent for improvements in the city distribution system to take care of Skagit current.

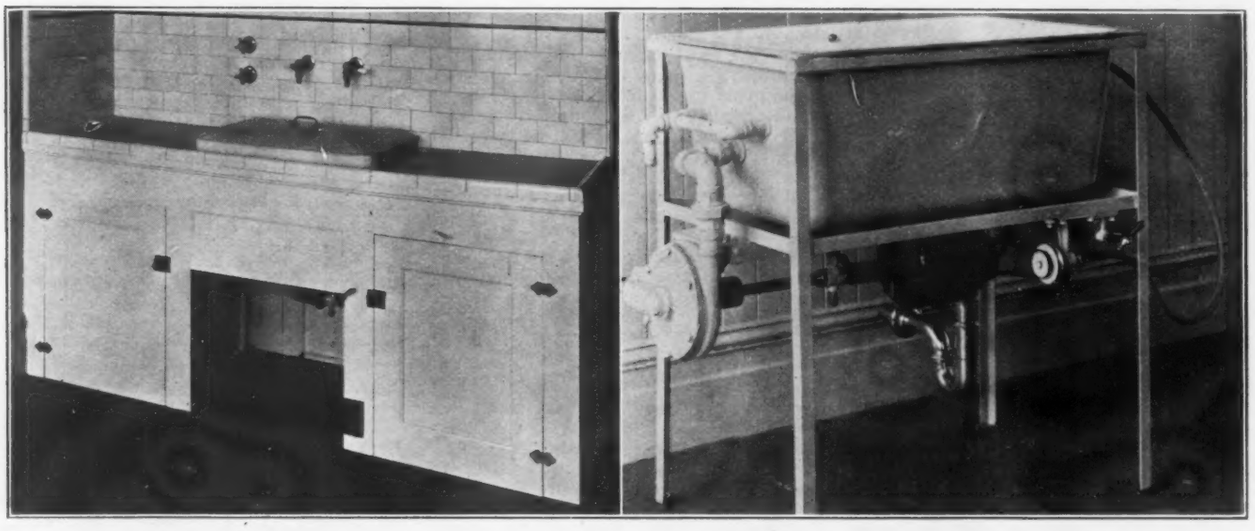
Manufacturer Presents Annual Report.—In the annual report of the Westinghouse Electric & Manufacturing Company issued recently, announcement is made that the company earned 18 per cent on its stock during the last fiscal year. The report states that the net income available for dividends was $16,125,303. Gross earnings for the year were $154,412,918.

Illuminating Engineering Society Chapter Is Organized

Nineteen members of the electrical industry of the San Francisco Bay territory who are interested in matters pertaining to better illumination met in San Francisco, Calif., on June 10 and formed the Bay Cities Chapter of the Illuminating Engineering Society. Clark Baker, of the National Mazda Lamp Works of the General Electric Company, Oakland, Calif., acted as temporary chairman pending the election of officers.

James G. Cravath, illumination engineer and president of the Pioneer Electric Company, Richmond, was elected as chairman of the chapter and S. H. Russell, of H. B. Squires Company, San Francisco, was elected vice-chairman. C. A. Russell, Pacific Gas and Electric Company, San Francisco, was elected secretary. A board of managers was also elected and comprises the following: Clark Baker, National Mazda Lamp Works of General Electric Company; H. E. Sandoval, manager of electric sales, Pacific Gas and Electric Company; R. S. Prussia, illumination engineer of the Westinghouse Lamp Company; Romaine W. Myers, engineer, Oakland, and Dr. Percival Dollman, oculist, San Francisco.

Rates Reduced by Pacific Power & Light Company.—A new schedule of rates has been filed with the State Department of Public Works at Olympia, Wash., by the Pacific Power & Light Company, announcing a general reduction in electric light and power rates in the entire territory covered by the company's lines. Operations of the company cover numerous cities and towns and rural communities throughout the Yakima Valley, the Walla Walla district and the White Salmon section. By reason of inability to check stations and get the billings out in time, the company states it was impossible to make the change effective for all points as of May 1. Those coming under the May 1 change were Walla Walla, Pomeroy, Dayton, Waitsburg, Pasco and Kennewick.



New electric dishwashing machine recently put on the market by the Fassio Company of San Francisco. The new machine is a sink and dishwasher combined and is installed as shown in the illustration at the left. General construction of the dishwasher is shown at the right. The new device is equipped with a flexible shaft which may be used to drive a pot scouring brush or either of two types of beaters. The manufacturer also claims that light washings may be done in the sink.

New Officers Are Named by Utah Engineering Societies

The annual meeting of the Utah section of the American Institute of Electrical Engineers was held jointly with the Utah Society of Engineers at Saltair, Salt Lake City's famous resort, on the evening of May 31. About 100 members and their wives were present. A banquet was served with Dr. Joseph F. Merrill, dean of the school of mines of the University of Utah, and former president of the Utah section of the A.I.E.E, as toastmaster.

New officers for the Utah section, A.I.E.E., were elected, as follows: H. W. Clark, city engineer's office, Salt Lake City, chairman; John Salberg, engineer, Westinghouse Electric & Manufacturing Company, Salt Lake City, secretary and treasurer; C. R. Higson, engineer, Utah Power & Light Company; Lester B. Johnson, engineer, General Electric Company, Salt Lake City; W. M. Scott, superintendent, lines and service, Utah Power & Light Company; Leo Brandenburger, manager, Salt Lake City branch of Wagner Electric Corporation; and Paul P. Ashworth, distribution engineer, Utah Power & Light Company, executive committee.

The Utah Society of Engineers elected the following: R. A. Hart, senior drainage engineer, U. S. Bureau of Agriculture, Salt Lake City, president; Ernest Gayford, vice-president and secretary, General Engineering Company, Salt Lake City, first vice-president; James W. Wade, assistant manager, Tintic Standard Mining Company, Salt Lake City, second vice-president; J. A. Hale, engineer, Utah Power & Light Company, secretary; R. K. Brown, chief engineer, Salt Lake & Utah Railroad, treasurer; and H. C. Goodrich, chief engineer, Utah Copper Company, Salt Lake City, was named a member of the executive committee.

Annual Report Announces Growth of Utah Utility Company

The Utah Power & Light Company has published its annual report to stockholders for the year 1923. This report indicates substantial growth of the territory served by the company, and consequent extension of power facilities. There is shown a net gain of 3,541 electric customers during the year, to meet the demands of which the company has installed and placed in operation during the year an additional 11,000-kw. unit at its Grace hydroelectric plant. The report also states that work is under way on the new 14,000-kw. hydroelectric plant at Soda, Idaho, which plant is expected to be completed and in operation during the late summer of this year; and that improvements have been made in the Jordan steam reserve plant in Salt Lake City. The report further states:

"Further increases in power plant capacity must be undertaken without delay, and with this in mind the company has secured from the Federal Power Commission a preliminary permit for the Flaming Gorge site on the Green River in Utah, and, if investigations show the development of that site to be practicable, it intends to seek a federal license covering the construction there of what will be one of the largest dams in the United States and of a generating station from which electric energy can be produced annually equivalent to more than 40 per cent of the total energy produced by the company in 1923."

Another interesting feature of the report is the large growth shown in customer ownership of the company's 7 per cent cumulative preferred stock. The report states: "On Dec. 31, 1923, these customer-owners numbered 3,773, and held stock to the par value of $4,134,000, in addition to large local holdings of the company's bonds." Since the first of the year to May 1 there has been an increase in sales of stock to customers of $698,900 par value.

Diversion of Trinity River Is to Be Investigated

A thorough investigation is to be made of the proposed diversion of the Trinity River into Sacramento Valley in California. This project is covered by an application for a combined irrigation and power project made to the Federal Power Commission by W. H. Sampson, of Corning, Calif. The California board, appointed by the commission to investigate the project, reported in favor of the diversion. Further investigation on the part of the commission, however, indicates that the power alone cannot bear the cost of the project. There is doubt as to the ability of the lands which will be improved to bear enough of the cost to make the development profitable to all concerned.

Before taking final action, the commission is sending Major H. B. Bennion, its assistant chief engineer, to California to look over the project and has requested the Secretary of Agriculture to report as to the price the farm land would be justified in paying for the water.

The commission has just been advised by Mr. Sampson that the cities on the eastern side of San Francisco Bay are considering going to the Trinity for their water supply. The commission is anxious to establish whether or not this project is in a position to compete with San Francisco, which would like to furnish water to its neighbors from its Hetch Hetchy project, and with the Snow Mountain Water & Power Company, which is in a position to furnish the necessary water from Eel River.

Chinese June Wedding Held at Los Angeles Electric Club Meeting.—To open June Bride Week in Los Angeles, Calif., a mock Chinese June wedding was conducted at the June 2 meeting of the Electric Club of that city. Electrical gifts were purchased for the "Bride" and after all preparations had been made the "Bride" was married according to ancient Chinese custom. Miss Helen Mikesell, secretary of the Electrical Contractors' and Dealers' Association, acted the part of the Chinese June Bride and R. H. Manahan impersonated the father and later the Chinese minister. Other participants in the affair were: Miss Vere Crockwell, Roy Lockhart, E. P. Markee, Alfred Bachrach, B. G. Hatch, Howard S. Warren, R. C. Herb, E. B. Read, W. J. Sullivan, W. F. Wilson, R. E. Carter, F. B. Nightingale, who acted as chairman of the day, and little Misses Dodd and Shinn.

The South End Electric Company has moved from 1632 West 58th Street to 5501 Moneta Avenue in Los Angeles, Calif.

Books and Bulletins

PRINCIPLES OF ELECTRIC MOTORS AND CONTROL

By GORDON FOX. 499 pages, 298 illustrations. Cloth, 5¾x8¼ in. $3.50. Published by McGraw-Hill Book Company, Inc., New York, N. Y.

Many books have been published on the subject of electric motors, but few treat the subject from the standpoint of the application and operation of motors. Most texts treat the subject from the standpoint of the designer, but as the author points out, "a much larger class is interested in its application and operation than in its manufacture." A text which will assist in the selection of this universally used piece of electrical equipment, covering as it does the principles, performance, characteristics, and practical construction, should be of great value to the industry. The treatment is simple and of a practical character throughout, keeping in mind the needs of the man who must operate motors. Vector diagrams and higher mathematics are not used and theoretical types of motors have been mentioned only where they would have a bearing on practical designs. From the standpoint of the student this book should be of value as supplementary reading in an electrical engineering course.

The direct current motor with the various schemes of speed control as well as factors entering in the operation of this type of motor, such as armature reaction, is treated in the first four chapters of the book. The polyphase induction motor with its method of speed control; the polyphase synchronous motor; the single-phase motor, and the brush-shifting polyphase commutator motor are next treated.

Electric motor construction features covers one chapter, after which the principles of direct control and later the principles of alternating current control are treated.

Several chapters are then devoted to miscellaneous features of electric motors and control, such as the alternating current magnetic controller, the operation of motors in parallel and series, and electric motor braking.

Throughout the book the explanations are clear and the drawings and diagrams are plentiful. The most up-to-date equipment is described, and many good photographs are used. The author has collected information on this very useful piece of electrical machinery which should be of value, not only to students and engineers, but to anyone who is interested in the selection and the application of electric motors and controllers.

One very valuable feature of the book is a somewhat complete bibliography at the end of each of the chapters throughout the book.

E. R. S.

Chandeysson Electric Company, St. Louis, Mo., has recently issued five bulletins relating to the Chandeysson line of motors and motor-generator sets. The bulletins are replete with illustrations and descriptive matters.

Meetings

Announce Program for Northwest Association Convention

The program for the seventeenth annual convention of the Northwest Electric Light and Power Association, to be held at Gearhart, Ore., June 25-27, has been sent to all members of the association. General information concerning the convention, transportation, and hotel accommodations has also been sent out.

The Hotel Gearhart will be the headquarters for the convention and as many delegates as possible will be cared for there. Additional hotel accommodations will be provided at the Hotel Seaside, four miles from Gearhart. All convention sessions will be held in the Hotel Gearhart.

The program as announced by the general convention committee is as follows:

WEDNESDAY, JUNE 25

9:30 A.M.

General Session

Geo. L. Myers, president, presiding.

Address of Welcome.

Response.

Appointment of Convention Committees.

Annual report of secretary and treasurer, C. H. Gueffroy, Pacific Power & Light Company, Portland, Ore.

Annual address of the president, Geo. L. Myers, Pacific Power & Light Company, Portland, Ore.

Address, Franklin T. Griffith, president, National Electric Light Association, Portland, Ore.

Announcements.

2:00 P.M.

General Session Continued

Address—"Electrifying America," M. H. Aylesworth, managing director, National Electric Light Association, New York, N. Y.

Address—"The Potential Tomorrow," Irving E. Vining, president, Oregon State Chamber of Commerce, Ashland, Ore.

Paper—"Merchandise Accounting," C. W. Platt, Pacific Power & Light Company, Portland, Ore.

Paper, M. J. Wilkinson, Pacific Power & Light Company, Portland, Ore.

Paper, A. J. Johnstone, Portland Electric Power Company, Portland, Ore. (to be read by M. J. Wilkinson).

Address—"The Indeterminate Permit," J. A. Laing, Pacific Power & Light Company, Portland, Ore.

Address—"Taxation," A. A. Smith, Eastern Oregon Light & Power Company, Baker, Ore.

TISURSDAY, JUNE 26

9:30 A.M.

Open Session of Public Relations Section

Norwood W. Brockett, presiding.

Address, George A. Hughes, president, Edison Electric Appliance Company, Chicago, Ill.

Discussion of the Bone Bill.

Report of Executive Committee.

Address—"Observations on Rural Electrification," Lewis A. McArthur, Pacific Power & Light Company, Portland, Ore.

Address—"Better Home Lighting Activity," A. C. McMicken, Portland Electric Power Company, Portland, Ore.

Reports of committees.

General discussion.

2:00 P.M.

Kilowatt Cup Golf Tournament.

FRIDAY, JUNE 27

9:30 A.M.

Concurrent Meetings of Sections

Accounting Section, A. N. Cudworth, presiding.
Commercial Section, W. M. Shepard, presiding.
Technical Session, John B. Fiskin, presiding.

8:00 P.M.

Executive Session.

Reports of committees.
Constitutional amendments.
Election of officers.

Joint Picnic Held by Northwest Electric Club Members

A joint picnic, the Electric Club of Seattle, Wash., and the Tacoma Electric Club participating, under the auspices of the Seattle organization was held at Enumclaw, Farmer's Picnic Grounds, on June 14. The frolic was an all-day affair and the program included a picnic lunch at noon, a ball game between the Seattle and Tacoma jobbers and dealers, field meet and dancing.

The general committee in charge of arrangements included: Joe Wells, of Fobes Supply Company, chairman; R. F. Cole, Economy Fuse Company, Charles Smutz, Western Electric Company, and James G. Stewart, Pacific States Electric Company. George Miles, of the Westinghouse Electric & Manufacturing Company, was chairman of the transportation committee.

COMING EVENTS

Pacific Coast Electrical Association—
Annual Meeting—Coronado, Calif.
June 16-20, 1924

Wyoming Public Utilities Association—
Annual Convention—Casper, Wyo.
June 23-24, 1924

Northwest Electric Light and Power Association
Annual Convention—Gearhart, Ore.
June 25-27, 1924

Pacific Coast Electrical Supply Jobbers' Association—
Quarterly Meeting—Del Monte, Calif.
July 24-26, 1924

New Manager Addresses San Diego Club.—Gen. George H. Harries, new manager of the San Diego Consolidated Gas & Electric Company, was the speaker of the day at the June 3 meeting of the Electric Club of San Diego, Calif. Gen. Harries used no particular topic for his talk, stating that he preferred to become better acquainted with the members of the club before using any definite subject. L. M. Klauber, general superintendent of the San Diego utility company, acted as chairman of the day at the meeting.

CORONADO AND GEARHART CALLING: ANSWER "I'M HERE"

In the days long gone to seed, when France was a feudal state and bold knights spent their days in philandering and fighting—

One of the boldest and bravest of that hardy lot was wont to rush into the fray, waving aloft his lance, shouting in terrifying tones,—

"I'm here!"

And, as the field slippery with blood and encumbered with broken armor could testify, he was there—there when the fight started and finished—there as long as his will and way was contested and—

Today, several hundred years thence, this same knight, in the guise of a ballyhooer, issues a challenge in stentorian tones to men of the Electrical Industry—

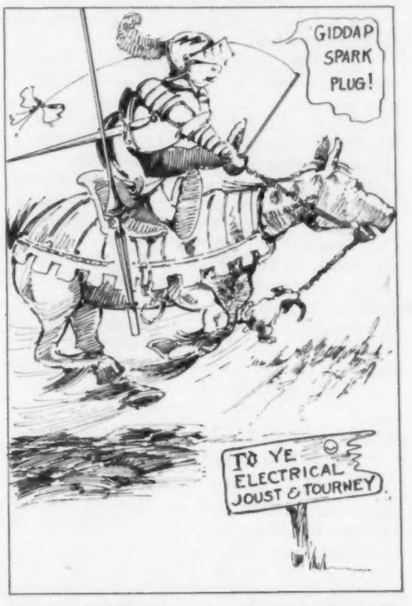
Bidding them to be there and answer "I'm here" when the roll is called at Coronado and Gearhart.

Be at these conventions—one or the other, or both. Come prepared to give and receive—to teach and learn; come prepared to do everything in your power to make the sessions high lights in convention history.

Leave behind your trials and troubles; give your grouch and gloom the go-by and broadcast the sunshine of your presence.

Gird on your armor, furbish up your trappings, get a horse that will fit you and gallop to these gatherings. You are needed.

Come and do battle against the foes in the game who think checks marked N.S.F. are signs of good business; who think profits is spelled l-o-s-s; who would rather be wrong than rich.



Hasten, oh Knights! or by the rood thou shalt abye thy sloth!

Come and exchange clouts with them—give them round knocks on the sconce, maul their mazzards and slap their skulls—

Shout "I'm here!" and throw terror into their quaking souls.

The time has come when men of the Electrical Fraternity must stand and be counted—when the lambs be divided from the rams. The days of dilly-dallying are done and the—

Hurry! Hurry! Hurrah times are here.

These are the days of piping peace but, is life so dear or peace so sweet, as to be purchased at the price of ignorance and indifference?

I wot not—so—

Come to these conventions and lift your lusty voice in that stirring anthem—

"Together we stick; divided we're stuck."

Manufacturer, Dealer and Jobber Activities

The Electric Equipment & Manufacturing Company, Toledo, Ohio, manufacturer of Lead-All box bar, has appointed the Atlantic-Pacific Agencies Corporation, San Francisco, coast distributor for the line.

The Brown Instrument Company, Philadelphia, Pa., has recently published a 68-page booklet entitled, "Instructions for the Installation and Care of Thermo-Electric Pyrometers." The book is one of the most complete ever published on the subject. The publication contains information regarding protecting tubes for thermocouples and various methods of wiring indicators and recorders, methods of eliminating cold junction errors, methods of installing couples, and of checking thermocouples, wiring, or the accuracy of the instruments. These subjects are gone into from the practical and theoretical angles, as well as such other subjects as open and conduit wiring, mounting the instruments, locating defects in the thermo-electric circuit by various means, and many other points which will be of immense interest to the man who has to work with the equipment from day to day. This book also contains temperature millivolt equivalents for thermocouples and conversion of Fahrenheit and Centigrade scales. It is free to users of pyrometers.

The Globe Electric Supply Company of Denver, Colo., has been appointed agent for Colorado, Utah and New Mexico by the Railway & Industrial Engineering Company of Greensburg, Pa. The engineering company manufactures outdoor switching and protective equipment.

J. T. Pearson Company, of Detroit, Mich., has recently published a small pamphlet devoted to "End-O-Let." The device is designed for use in connection with conduit end fitting. The Pearson company is general sales representative for the End-O-Let company, manufacturers of the device.

The Novo Manufacturing Company has recently been organized in Los Angeles, Calif., by E. F. Ford, formerly owner of the Ford Electric Fixture Company of that city. The new company has moved into its newly constructed factory at 115 W. 16th Street and will specialize in the manufacturing of wrought iron fixtures and lanterns. An attractive catalog of the line of fixtures manufactured by the company has been issued recently.

The Atlas Electric Supply Company, Los Angeles, Calif., has recently added additional floor space to its establishment on San Pedro Street in order to allow the company to better display its samples of fixtures and glassware. The company is represented by L. Soldoff.

The Packard Electric Company, Warren, Ohio, has recently issued a new booklet, containing illustrations of the company's line of transformers, that has attracted considerable attention. The publication is illustrated with Macyart pictures, which, when viewed through colored lenses, give the picture the appearance of extraordinary depth.

The California Street Lighting Sales Company, Los Angeles, Calif., has been appointed exclusive distributor of the Union Metal Manufacturing Company's line in Los Angeles and southern California. As such the company will have charge of the distribution of all the Union Metal posts in that territory.

The Torrington Vacuum Cleaner Company has closed its factory branch in Denver, Colo.

The Art Metal Spinning Works of Denver, Colo., is extending its trade area with the appointment of Clayton P. DeLong, formerly of the fixture department of the Public Service Company of Colorado, as an outside salesman.

The Commercial Switchboard Manufacturing Company in Denver, Colo., has changed its name to the **Commercial Manufacturing & Supply Company,** according to recently amended articles of incorporation filed with the Colorado secretary of state.

The Automatic Electric Washer Company has announced the results of sales campaigns recently staged with the following central station companies: Utah Power & Light Company, 1,154 machines, Nebraska Power Company 406, Colorado Springs Light, Heat & Power Company 162, Southern Colorado Power Company 225, and Idaho Power Company 605.

The Cutter Company, Philadelphia, Pa., has issued a treatise on the protection of electrical currents. The book is of 96 pages and includes text and illustrations covering the facts. The book is entitled "Hand Book of the U-RE-LITE." The book may be secured by addressing the Cutter Company.

Another uptown electrical shop has been established in Denver, Colo., at 408—15th Street. Harry Shockett, who has maintained a shop in the West Colfax district for several years, is the proprietor. Both places will be maintained by Shockett.

The Westinghouse Electric & Manufacturing Company has recently published a new booklet, known as Folder 4532-A, dealing with Westinghouse fabrics and papers for insulating purposes. All the forms of treated and untreated fabrics, papers, sleeving, tapes, cord and thread manufactured by the company are fully described in the booklet and their principal applications given. For the purpose of easy reference, tables have been included setting forth in tabulated form the thickness, width, approximate weight, and size of the various materials described. For the treated fabrics and for the untreated fabrics and papers, approximate breakdown voltages have been given for each material under these classifications.

The Edison Lamp Works of the General Electric Company, Harrison, N. J., has recently prepared for distribution by retail dealers, two new novelties for building good will. A leather notebook and a leather keytainer are the new novelties that have been prepared and which can be secured with the dealer's name imprinted on them at small cost. Each device is of attractive appearance and should be well received by customers. Orders for lots of 100 or more are being received by the company.

The Paine Company, Chicago, Ill., has moved from 1742 West Van Buren Street to 2949 West Carroll Avenue in the same city. The company now occupies its own building at the new location and will manufacture toggle bolts, expansion shells and other metal specialties there.

W. Wesley Hicks, San Francisco, Calif., has brought out a new type of electric water heater equipped with thermostat and made in sizes from 1 kw. to 100 kw. capacity. The heater is heavily lagged to reduce radiation losses and has removable copper heating chamber and removable heating core.

Pater Matrem amat
Mater Patrem amat
HELLO BRUTUS - YEH! JULIUS SPEAKING! OH JUST RESTING UP TONIGHT - SOME OF THE BOYS ARE STIRRING UP A BIT - SAY THERE'S A HOT NUMBER COMING OVER THE RADIO BY CUICO VALLEY POKE (ENTER MATREM AMAT) - HAVE YOU HEARD IT - TELL MARC TO TUNE IN HE LIKES THAT SNAPPY STUFF - YEH HERE HEADIN SOUTH TOMORROW - WELL SLONG OLE TOP -
HOW LONG THEY GONNA KEEP ME ON THIS K.P.?
PUT 'EM DISHES IN HERE AN HUSHUS
HOT DICKETY DOG
© Western Electric ©
Caesar's Legions - not the least perturbed by Pompey's rabid threats - go about their little personal affairs prior to Crossing the Rubicon.

C. D. Russell, for Western Electric Company.

ELECTRIFIED HISTORY — CAMP LIFE IN ANCIENT ROME

Personals

Berkeley H. Snow, former district manager at Hood River, Ore., for the Pacific Power & Light Company, has been appointed Northwest editor of the Journal of Electricity. Mr. Snow's resignation became effective May 15,

BERKELEY H. SNOW

and he will make his headquarters in Portland where he will open offices. Mr. Snow was born in Portland, July 8, 1891, and on completion of his early schooling at the Portland Academy, entered Cornell University, Ithaca, N. Y., where he graduated in 1913. In the fall of that year he entered the employ of the Pacific Power & Light Company as chief clerk at Vancouver, Wash., and from that time on was transferred from time to time as chief clerk or cashier to White Salmon, Prosser, and Pasco, Wash., and Pendleton, Ore. In 1917 he enlisted in the engineer corps of the American army, and after two years of varied military experience in which he received a commission and participated in the three major offensives with the 4th Engineers, IV Division, he was discharged in the summer of 1919. He returned to his old company and early in 1920 was sent to Hood River as district manager.

Harry C. Tilden recently joined the sales force of The Electric Corporation in Los Angeles, Calif. Mr. Tilden was formerly connected with the H. L. Miller Company in Pasadena, Calif., and also was employed for a number of years in the power sales department of the Southern California Edison Company, Los Angeles.

George Kidd and **A. T. Goward**, president and vice-president, respectively, of the British Columbia Electric Railway Company, Vancouver, B. C., have returned from an extended vacation in Europe and have again taken up their duties.

John F. Greenawalt, publicity director for the Mountain States Telephone & Telegraph Company, Denver, Colo., was the principal speaker recently before the regular luncheon of the Denver section of the American Institute of Electrical Engineers.

A. E. Peat, treasurer and comptroller of the San Joaquin Light & Power Corporation, Fresno, Calif., recently left on a three months' trip to Europe. Mr. Peat is visiting England for the primary purpose of attending the World Power Conference in London. From there he will visit the large engineering projects in France, Belgium and Italy, particularly in the northern part of the latter country where he will investigate hydroelectric development.

W. A. Brackenridge, vice-president, **Clifton Peters**, secretary, and **H. C. Rice**, appliance sales agent, of the Southern California Edison Company, Los Angeles, Calif., attended the National Electric Light Association convention at Atlantic City, N. J.

W. G. Vincent, Jr., vice-president of the Pacific Gas and Electric Company, San Francisco, Calif., is in the East on business.

J. A. McWilliams, sales manager of the Valley Electrical Supply Company, Fresno, Calif., resigned June 1 to accept a position with the Metropolitan Life Insurance Company, San Francisco. Mr. McWilliams was identified with the Washington Water Power Company of Spokane, Wash., for twelve years, for five years of this time as one of their district managers. This position he resigned in the summer of 1922 to come to California for his wife's health. Locating in Fresno, he became affiliated with the Valley Electrical Supply Company as a range specialist, later being promoted to manager of range sales. When his company inaugurated its program of expansion he was promoted to sales manager. In this capacity he guided the work of organization in a creditable manner, and his leaving is felt as a direct loss to the industry.

Hugh Gordon, attorney for the California Railroad Commission, San Francisco, Calif., for the last four and a half years, has tendered his resignation, effective as of July 1, and will move to Los Angeles to resume the private practice of law. Prior to becoming attorney for the Railroad Commission Mr. Gordon was assistant city counsel of Los Angeles County.

Miss Bertha J. Dale, assistant manager of the personnel department, Pacific Gas and Electric Company, San Francisco, Calif., and secretary of the Pacific Service Employees' Association, took an active part in the arrangements for the Association's dinner held June 14 at the Civic Auditorium, San Francisco.

L. D. Callins, representative of the Western Electric Company with headquarters in Phoenix, Ariz., was a recent visitor to Los Angeles, Calif.

M. H. Aylesworth, managing director of the National Electric Light Association, New York City, will attend the annual convention of the Pacific Coast Electrical Association to be held at Coronado, Calif., June 16-21.

Walter S. Rugg, general sales manager of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is making a tour of the entire United States. He has already visited the Intermountain country and will spend some time on the Pacific Coast before returning to the factory.

W. E. Durfey, assistant treasurer of the San Joaquin Light & Power Corporation, Fresno, Calif., recently spent several days in Los Angeles.

E. L. Barnes, president of the Barnes-Lindsley Manufacturing Company, Portland, Ore., was a recent visitor to San Francisco, Calif., stopping there on his way to eastern points.

S. W. Bishop, executive manager of the Electrical Cooperative League, Denver, Colo., is taking the illumination design course at Nela Park, Cleveland, Ohio.

Major-General George Herbert Harries, a vice-president of H. M. Byllesby & Company, arrived in San Diego recently to take up the management of the San Diego Consolidated Gas & Electric Company, assuming the position left vacant by the transfer of **H. H. Jones** to Minneapolis. It is understood that he is not to have permanent charge of the San Diego utility but that his plans include visits to other Byllesby properties on the Pacific Coast. General Harries, a native of Havensford, South Wales, took degrees at Howard University and Kentucky State University, and soon began a military career replete with brilliant episodes. In 1895, after campaigns in the Western Indian wars, he was made a brigadier general commanding the army and navy militia in Washington, D. C. In the Spanish-American war he served before the siege of Santiago. In the World War, he commanded a brigade of colored infantry on the front. Later, because of his extensive executive training in utility management, he was placed in charge of construction and operation of the port of Brest. In the course of his military career he has received, beside the U. S. Navy Distinguished Service Medal, honors from eight European governments including the French Legion of Honor. In civil life, General Harries' career has likewise been vivid. In 1895 he became president of the Metropolitan Railway

MAJ.-GEN. G. H. HARRIES

Company, Washington, D. C., and later, vice-president of the Washington Railway & Electric Company. In 1911 he became identified with H. M. Byllesby & Company, and was shortly made president of the Louisville Gas & Electric Company. He has been a director of the Standard Gas & Electric Company and of H. M. Byllesby & Company for some years, and is a past president of the American Electric Railway Association, the Association of Edison Illuminating Companies and the Illuminating Engineers' Society.

Franklin T. Griffith, president of the Portland Electric Power Company, Portland, Ore., will be in attendance at the annual convention of the Pacific Coast Electrical Association to be held at Coronado, Calif., June 16-21.

J. G. Monahan and **G. F. Wakeman** of the Edison Storage Battery Supply Company, Los Angeles, Calif., recently spent considerable time at San Pedro, Calif., in connection with an important marine installation of Edison batteries.

H. D. Randall, General Electric Company; **J. P. Sprunt**, Westinghouse Electric & Manufacturing Company; **E. P. Kipp**, Hazard Manufacturing Company; and **F. L. Easton**, Economy Fuse & Manufacturing Company, were unanimously elected to serve as representatives of the Manufacturers' Division on the Advisory Board of the Electrical Cooperative League, Denver, Colo., at the Division's last meeting of the fiscal year held early in June.

Preston Millar, president of the Electrical Testing Laboratories, New York City, was a recent Los Angeles, Calif., visitor. While there he addressed a special meeting of the Electric Club attended by over three hundred prominent members of the electrical industry in Los Angeles and southern California.

Ellery W. Stone, since May, 1922, sales manager, radio department, Pacific States Electric Company, San Francisco, Calif., has resigned to become president of the Federal Telegraph Company of that city. It is felt that Mr. Stone's knowledge and experience make him particularly well fitted for the position. Prior to his service with the Pacific States Electric Company, in 1922 he made a survey of the radio situation in China, particularly in the south, at the request of officials of the Southern Chinese government. Mr. Stone was general manager of Moor-

ELLERY W. STONE

head Laboratories from 1920 to 1922, and for a year prior thereto was California manager for Kilbourne & Clark Manufacturing Company and its subsidiary, Ship Owners' Radio Service, Inc., in charge of Los Angeles and San Francisco offices. From 1914 to 1917 he was U. S. radio inspector for the sixth radio district, San Francisco, and the next two years served as district communications superintendent of the Eleventh Naval District, San Diego, Calif. He is the author of two books on radio and of many technical papers.

Harry Hartzell, of Maydwell & Hartzell, Inc., San Francisco, Calif., is on an extended trip through the Northwest in the interest of his firm. He will visit among other places Portland, Ore., and Seattle and Spokane, Wash.

Roy Worth, assistant district manager of the Pacific States Electric Company, San Francisco, Calif., recently spent a few days in Los Angeles, Calif., with the local representatives of that company.

A. E. Buttner, general manager of the Electrical Specialty Company, San Francisco, Calif., has just returned from an extensive trip to eastern cities. While in that territory, Mr. Buttner visited many of the factories represented by his company.

Fay Woodmansee, president of the Electrical Engineers' Equipment Company, electrical manufacturers of Chicago, Ill., recently spent several weeks in Los Angeles and southern California.

Ray W. Turnbull, assistant Pacific Coast sales manager of the Edison Electric Appliance Company, with headquarters in Portland, Ore., was recently in Spokane, Wash., in connection with sales matters. He also visited several important towns served by The Washington Water Power Company of Spokane, in company with J. F. Farquhar, general agent.

C. W. Platt, since 1912 assistant secretary and treasurer of the Portland Gas & Coke Company, Portland, Ore., has been chosen secretary and treasurer of that company and the Pacific Power & Light Company, also of Portland, taking the place left vacant by the death of **George F. Nevins**. Mr. Platt's service with the former company dates from April, 1909, when he became chief bookkeeper. Prior to that time he spent a brief term as draftsman for one of the subsidiary companies of the Bell telephone system, and served four years in the accounting department of the Union National Bank of Pittsburgh, Pa.

Fred S. Mills, Pacific Coast representative of Curtis Lighting, Inc., has just recently removed from the Pacific Finance Building in Los Angeles, Calif., to the Merchants National Bank Building, where he has opened an engineering and fixture establishment. Mr. Mills announced that he lately opened offices in the Terminal Sales Building, Seattle, Wash., with **Charles G. Boyd** in charge. This is in addition to his San Francisco office, which has been in operation for some time.

L. A. Blackburn, of the merchandising division of the Westinghouse Electric & Manufacturing Company, San Francisco, Calif., left on May 28 for an extended trip to the works at Mansfield, Ohio, East Pittsburgh, Pa., and South Bend, Ind. From Mansfield he will go to Pittsburgh and will return by way of South Bend, visiting the George Cutter Works there.

Edgar G. Bartell, formerly in the electrical fixture business in St. Louis, Mo., has just recently joined the Los Angeles, Calif., staff of Fred S. Mills, Pacific Coast representative of Curtis Lighting, Inc.

F. L. Easton, Economy Fuse & Manufacturing Company representative in Denver, Colo., is at Hot Springs, Va., where he will attend a national sales reunion and conference of the Economy Fuse & Manufacturing Company and also the Electrical Jobbers' convention.

Harold E. Willis, since September, 1923, president of the Sacramento Valley Electrical Society, and one of the organizers of that association, has been affiliated with the electrical industry since 1906. In that year he entered the employ of the Northern Electric Railroad at Chico, Calif., and became successively traveling auditor, chief clerk and traffic manager. In 1908 he joined the Central California Transportation Company, San Francisco, as auditor of freight and passenger accounts. Three years later, as traffic manager and superintendent, he took charge of the

HAROLD E. WILLIS

logging railroad of the Verdi Lumber Company in Nevada. He became associated with the Oakland, Antioch & Eastern Railroad in 1916 as traveling freight and passenger agent with headquarters in Marysville, Calif. Since 1921 he has been general agent of the San Francisco-Sacramento Railroad at Sacramento, Calif. Mr. Willis is an active worker in the Chamber of Commerce, the Rotary Club and other fraternal and civic organizations.

Obituary

Thomas Commerford Martin, from 1882 to 1909 editor of Electrical World and for the following ten years secretary of the National Electric Light Association, died May 18 at Pittsfield, Mass. Mr. Martin was actively associated with the development of the electrical industry, particularly electrical engineering and related phases. For two years he was affiliated with Thomas A. Edison in laboratory work and electrical development. He was one of the founders and charter members of the American Institute of Electrical Engineers, and a charter member and past president of the New York Electrical Society, as well as a member of numerous other electrical and engineering societies. Mr. Martin was also the author of a number of books, "Edison, His Life and Inventions," being probably his best known work.

Stanley S. Stevens, manager of Stevens Sales Company, Salt Lake City, Utah, died May 17, following an automobile accident.

Trade Outlook

San Francisco

Reports from the different branches of industry indicate that business in general in this territory is fair. Building and general construction contracts already let assure continued activity in this line, although the demand for lumber for new work has somewhat subsided.

The hoof and mouth epidemic is regarded as completely under control, and all bans on travel have been lifted so that motorists and other tourists may travel in all parts of California without inconvenience. Merchants dealing in vacation and camp supplies report a fair demand for the opening of the season.

A substantial increase in trade between San Francisco and Cuba is looked for, due to the fact that the Cuban sugar crop is expected to be a bumper. Cuba imports California beans and canned fruits and vegetables in large quantities, and the additional buying power made possible by the big sugar crop should result in heavy orders for these commodities as well as manufactured articles.

Although general business conditions have been quiet for several months, attention is invited to the fact that this period is normally the least active of the year, that the end of that period is approaching, and there is no reason not to expect a steady increase from now on.

Los Angeles

Business conditions in Los Angeles have improved somewhat during the first week in June as compared with the preceding two weeks in May, and this is especially true in the electrical industry. Retail sales have picked up immeasurably. The sale of radio apparatus is good and shows signs of steady improvement, which is expected to continue well into the summer months. Wholesalers are well pleased at present prospects and are much more optimistic than they have been during the past few months, despite the slump in the building industry, which shows a decline of approximately fifty per cent for the last two weeks of May as compared with the corresponding period last year.

Manufacturers continue to report excellent business conditions prevailing and anticipate their continuing. The unemployment situation in Los Angeles is not considered serious, even though there has been a number of men out of work due to the recent foot and mouth epidemic and to the decline in the building industry. Steady improvement is looked for soon.

Portland

Electrical jobbers report sales slow in the smaller heating devices and confined to immediate needs. Ranges are selling about as well as a year ago, with the average of all sales somewhat less than in 1923.

In the lumber industry production keeps up well. It is at present about 10 per cent below that of a year ago, although there are indications of a revival of the kind of business enjoyed in 1923. Some logging crews have stopped work because of the great fire hazard of logging under present weather conditions.

The lack of rainfall has caused damage in the agricultural districts, although so far the orchards have not suffered greatly. Power companies in Portland are running 30 per cent on steam.

Building permits issued during the past month in Portland were about equal to those of May, 1923, with a slight increase in the number of residences. Bank clearings for the month showed an average daily increase of $100,000 over those for the same month a year ago. There was also a gain in shipping. Unemployment is on the increase, due partly to the influx from neighboring states.

Salt Lake City

Extensive rains have brought great relief to sugar beets, spring grains and other crops, and assured the maturing of much dry land grain. With good crops certain, the Intermountain country may look forward to a prosperous season.

There appears to be an unusually large amount of activity among the electrical contractor-dealers in Salt Lake City. This is brought about not only by the building of many new homes, but also by the remodeling of many present homes, with resultant improvement in wiring and inclusion of more convenience outlets so that the entire electrical installation is made more modern and convenient.

Inquiry among the jobbers brings out the fact that their business for the first five months of this year shows a fair increase over that of the same period of last year, and that they are looking forward to continued improvement.

To meet increasing requirements for service, the Utah Power & Light Company is entering upon a summer program involving improvements and increased facilities in its Salt Lake City distribution system and also at other points on its lines.

An improvement is noted generally in credit conditions and collections.

Spokane

Mining conditions continue to be good. A number of large operating companies have declared substantial dividends, and the industry is characterized by a feeling of optimism and confidence.

The past two weeks have been marked by continued dry weather, with the exception of one heavy rain in the Colville Valley north of Spokane. Concern is manifested throughout the Inland Empire over the lack of rain, and heavy losses in the wheat crop are anticipated. This condition is leading to cancellation of orders for farm machinery, and has already affected retail trade in Spokane.

The packing business has been running at reduced output owing to decline in the amount of live stock shipments to Spokane. This is regarded, however, as merely a temporary condition.

The woodworking plants have nearly all reduced output on account of slackness of demand in Eastern markets. Lumber prices are lower in Spokane than they have been for a long time, and it is hoped that builders will take advantage of this situation. The box factories are prepared for a dull season, because of the large reduction in fruit output anticipated for the season.

General construction work is rather dull, but road contracts being placed now will stimulate activity.

Denver

Business conditions in Denver point to sustained prosperity. During April, Denver showed a 7.1 per cent increase in building permits. Last month the amount of permits issued was $3,027,550, an increase of $2,850 over May of last year, when all records were broken. Figures for the first five months of this year show building permits totaling $10,483,300 in value, an increase of $1,020,550 over the first five months of last year.

It is estimated that Colorado will produce more than twice as many bushels of wheat as it did last year, and that its bean acreage for 1924 will be about 60 per cent greater than the 1923 total.

Recent heavy rains have improved the soil conditions materially throughout the state although they have delayed farm work somewhat. Bountiful crops are predicted in all sections. and there is a decided feeling of optimism.

Denver showed an increase in bank deposits on May 1 of $2,779,900 over those of a year ago. In the last month Denver banks gained $551,030 in bank deposits. Department stores report gains in net sales and better collections than at this time twelve months ago.

Seattle

Reports from the leading stores in Seattle show a slight slackening in the volume of retail trade. There is no overstocking. Purchasing is cautious, with expenditure largely for necessities. Collections have slowed up materially.

The lumber situation shows little change and is anything but satisfactory. Every branch of the industry is indirectly affected, of course, by the slackening in commercial logging operations. Northwest lumbermen look at the problem as one solely of overproduction, which will gradually be overcome. Wages in camps and mills have been sharply reduced.

Building permits for the month of May reached a total of $3,200,000. Seattle building continues exceptionally strong, a feature of the situation being the unusually large number of homes, of the better quality, now under construction.

Seattle contractor-dealers in the electrical business report the past two weeks' volume on a parity with the preceding two weeks, and predict that June will show a very substantial increase, especially in sale of electrical gifts. Considerable volume of new contracting is under way, due to the large building program in the city, and this work is expected to show increase. Competition is keen, and prices not generally satisfactory. Stocks are in good shape and replacements easy. Collections are reported satisfactory.

Up from the "Stove Committee"

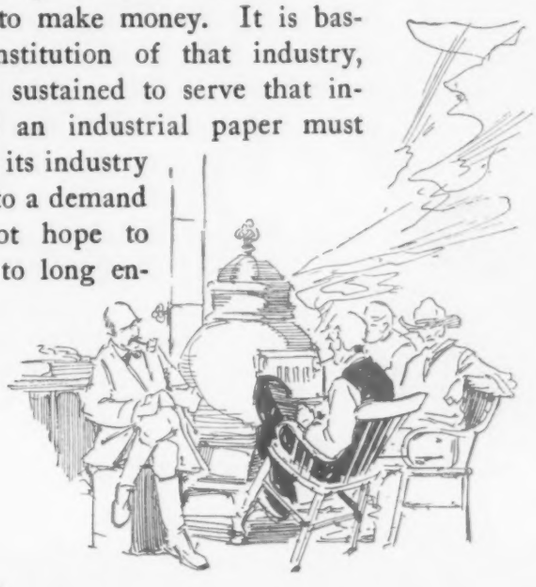
ON THE old days when communities were small it was very easy to get the news. The "stove committee" met each evening in the village store. The chief men gathered there and sat round the pot-bellied wood burner and the sawdust box and smoked and chewed tobacco. They gossiped, talked politics, argued on religion, compared experiences, heard the news and carried it home. The "stove committee" of the village store has been a very fundamental institution in the development of American social and civic life.

But as each community has grown large there has always come a time when all the thinking men of the town could no longer meet together around a stove. There were too many of them. Some new method of expression had begun to be vitally needed to tell the news and what men thought about it—and they seized upon the art of printing. So it has been in town after town over the world—first a "stove committee," then a newspaper. And the press in every case has sprung from the community because the community needed a vehicle for expression.

The Industrial Community

The process has been the same in industry. For industry brought a new kind of a community into the world, a community of men scattered across wide areas but nevertheless engaged in a common work and common thinking. These men, located in very many towns, could never, of course, come together in a village store. But they had common interests and common problems, and they also felt the need for a medium of expression, a way to learn the news and opinions of the leading thinkers of their industry. And so came the industrial press, the business press, to satisfy that need.

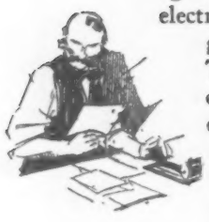
For the press of any industry is not just a private enterprise started because some man wants to make money. It is basically an institution of that industry, created and sustained to serve that industry, and an industrial paper must spring from its industry in response to a demand or it cannot hope to prosper or to long endure.



The Electrical Industry
a good Example

There could be no better illustration of all this than is found in the electrical industry. It is particularly interesting because the whole development has come within the space of fifty years. And we have seen the "stove committee" of that small group of early pioneers—Edison, Sprague, Brush, Bell and their few associates and followers—evolve into a great industrial community numbering today fully a million men and women. As the industry has grown, the need has grown for service from the institution of the press, and to meet that need the electrical press has sprung from that community—first a single paper, then other papers, as groups of electrical men began to specialize. The whole process is vividly pictured in the story of the McGraw-Hill electrical publications, which at the start numbered only one and today have increased to six papers, each serving some well-defined community of interest among electrical men.

The First Electrical Paper



THE first electrical paper began publication in 1874, a few months less than fifty years ago. It was called *"The Operator,"* for the electrical industry then embraced just the telegraph. But soon things began to happen. The incandescent lamp, the motor, the central station came and the vision of the electrical industry began to dawn. This pioneer paper changed its name to the *Electrical World,* and from that day to this, through all these years, it has continued, expanded and developed with the industry it serves.

No better record of the evolution of the electrical industry can be found than in the back files of the *Electrical World.* Through the eras of research, invention and engineering into the present era of economics and market development it has followed the trend of ideas and events in the world of electricity. It has been and it is today the executive and engineering paper of the industry, the newspaper of the electrical man, the vehicle that brings him the ideas and opinions of others, the mirror of his progress, his mouthpiece and his guide.

A Paper for the Street Railway

BUT it was not long before small growing groups of electrical men began to separate themselves and form new interests. Sometimes such a group would come to need a paper of its own devoted to its special problems and its own news in detail. So it was when the street railways of the country began to abandon the horse and cable and adopt electric power. This radical change in the methods of local passenger transportation brought many new and complex problems demanding the freest interchange of experience and opinion. The old *Street Railway Journal,* founded as a street-car paper in 1884, was changed to the *Electric Railway Journal* and from that time on has given its entire attention to the service of this branch of the electrical industry.

A Paper for the Merchant

AND then another situation arose. Retail merchandising had grown to be so great an interest and activity among electrical men that a strong paper to serve that field began to be demanded. And so the McGraw-Hill Company, having for years carried the responsibility for maintaining the institution of the press on an adequate basis in the electrical industry, purchased *Electrical Merchandise,* a small paper dedicated to a big idea, and built it up into a strong guiding paper renamed *Electrical Merchandising.*

But it was not just the creation of a publisher. It was the expression, the instrument of a new virile, specialized community of electrical men that needed a paper of its own. *Electrical Merchandising* has crystallized a new trend in the industry and rendered a great service to the appliance department of the central station, to the electrical contractor and dealer and to the

manufacturer and distributor of electrical merchandise, by pioneering in this fallow field, promoting this new business, providing a source of merchandising ideas, experience and inspiration and also a market place vitally needed.

A Paper for a Locality

THAT made three electrical papers in the group. Meanwhile, out on the Pacific Coast electrical men had felt the want of a paper to serve that distant section, to publish local news and discuss their special problems. They started a little paper called the *Journal of Water, Gas and Electricity*. One day the leaders of the electrical community on the Coast appealed to the McGraw-Hill Company to buy their journal and, by putting its stronger organization behind it, make the paper serve them more adequately. This time the demand for a paper sprang from the needs of a locality. The renamed *Journal of Electricity*, devoted entirely to the interests of the Far West, has been developed to satisfy that need.

A Paper for the Industrial Electrical Man

TWO years ago came the fifth paper, the culmination of a long and steady pressure for still another specialization in the electrical press. For a long time the large industrial works of the country had been complaining that they had insufficient recognition in the electrical press, no adequate place in which to describe and discuss the operation and maintenance of electrical and associated mechanical equipment. As a group, these specialized electrical men had become so numerous and so important that they were entitled to consideration from the electrical press. So the old *Electrical Review* was purchased and turned into the *Industrial Engineer*. Again there arose an insistent demand, this time from a community of industrial men, and an old paper was made over for them.

A Paper to meet a Trend

THE youngest child in the electrical press is *Electrical Retailing*, and its reason for existence is particularly interesting. The number of non-electrical stores that sell electrical appliances is steadily increasing. Those merchants who have grown so interested in electrical appliances are fast becoming a factor in the electrical market, but they are not electrical men and, thinking principally of the processes of merchandising, have bought and sold for price with little appreciation of the vital importance of quality and the dependability of these devices in service.

They are not yet interested in the electrical industry. So it became exceedingly important that a paper be made for these non-electrical retailers and for many small electrical dealers who, because they as yet lack broad interest in the electrical industry, do not read *Electrical Merchandising*. The press was called upon to help, and so this little paper *Electrical Retailing* was purchased and is being built into a strong influence to meet this specific need.

THOUGH not an electrical paper, with this group should also be mentioned *Power*. This publication has for years devoted space each week to the practical consideration of such electrical subjects as are encountered in the operation of industrial and private plants and has endeavored to serve especially those who by education and experience have come up through the steam end of the business.

SO, STARTING with a single pioneer paper, the *Electrical World*, there have developed these other papers, and we see the McGraw-Hill electrical group today numbering six publications. They reach regularly a total of 82,500 men and women of the electrical industry (not including *Electric Railway Journal* or *Power*) and are read and used by probably twice that number.

Electrical World—*the Master Paper*

The *Electrical World* is the "master paper," the engineering and executive paper of the industry, the only weekly newspaper for electrical men—written alike for the central-station man, the electrical engineer, the manufacturer, the jobber and the large contractor. It

reflects broadly the progress of the industry, interpreting the ever-changing prospect, recording experience, carrying the thinking of important men out to their fellows, providing a forum where each branch of the industry may discuss its problems in the presence of the other groups. *Electrical Merchandising, Industrial Engineer, Electrical Retailing, Journal of Electricity* and *Electric Railway Journal* all are devoting themselves to the service of separate specialized communities of electrical men who as groups have peculiar problems that require a paper of their own.

Changing Conditions *the compelling force*

If the electrical industry had not grown and gradually divided itself into these different classes of electrical men, the *Electrical World* could have continued to serve the entire industry itself as in the early days. But it became impossible for one publication to function as the "master paper" of the electrical industry and also attempt to give detailed attention to special interests and spread itself over the entire fast-expanding field. Therefore, to provide a complete coverage and an adequate press service to these new groups of electrical men as they began to form themselves into clean-cut communities, the new papers have been established at the call of the industry.

The industrial press belongs to the industries it serves. The electrical press is an institution of the electrical industry, established and supported by the industry for the dissemination of information to electrical men. Without the knowledge that comes to electrical men through the electrical press—through these McGraw-Hill electrical papers—the electrical industry could not have grown to its present greatness. Unless this electrical press continues to serve electrical men in accordance with their changing needs, the industry cannot hope to realize its great future—any more than a modern city could today depend upon an an old-time "stove committee" in a village store.

ROCKBESTOS

the Asbestos Covered Wires and Cables

A chief electrician wrote this!

"We have had motors that were so overloaded at times as to cause the linen tape to burn off, the connections to unsolder, and yet **not injure the asbestos insulation on the wire** (Rockbestos).

"We retaped the coils and put them back in the motors which are now running and in good condition. I find that Rockbestos insulation is tough and smooth, which was not the case with other wire we have used, and stands a lot of wear in grit and dust such as we have in the cement mill."

We handle all kinds of Rockbestos wire

"—the asbestos insulation on the Rockbestos wire was not injured."

RELY ON LOS ANGELES SEATTLE SAN FRANCISCO SERVICE

Baker-Joslyn Company

Second & Bryant Sts.
SAN FRANCISCO

330-332 Azusa St.
LOS ANGELES

2424-28 First Ave. So.
SEATTLE

Distributers

Hot Galvanized Pole Line Hardware
Wood Poles, Cross Arms and Pins
Construction and Linemen's Tools
Porcelain and Glass Insulators
Porcelain Knobs, Tubes and Cleats
Insulated and Bare Copper and Iron Wires
Rigid Iron Conduit and Fittings
Flexible Metallic and Non-metallic Conduit and Armored Conductors
Switches, Switchboards and Fuses
Insulating Materials

Appreciation

As we approach the new year we think the time appropriate to offer a word of appreciation and thanks to the men who have helped us make 1923 the most successful in our history.

It is indeed gratifying to note the quick recognition engineers have given to our improved insulators. This is evidenced by the amazing increase in business we have enjoyed.

J-D insulators have won the confidence of engineers not only because of their rugged qualities, their flash-over values and their fitness to meet the requirements of heavy duty, but also because of the fact that each insulator is manufactured under uniform standards throughout the entire process.

We realize this confidence has charged us squarely with the responsibility of ever maintaining and increasing our standards.

Every insulator that leaves our plant in 1924 will represent in design the most advanced engineering ideas available in this special field and each will receive the severest mechanical and electrical tests that can be devised for factory routine.

General Manager.

Jeffery-Dewitt Insulator Company
Kenova, W. Va.

Executive Sales Offices: 50 Church Street, New York City

ORANGEBURG
FIBRE CONDUIT

"Safety first" means Fibre Conduit

COMPARE the cost of a duct line with the cost of the cables it carries, to say nothing of the expense of service interruptions, and you will realize that the most vital requirement of underground duct is safety and reliability.

Orangeburg Fibre Conduit gives you the safest duct line. Its smooth bore prevents damage to the cable when drawing in, a frequent cause of failure. Every cable is isolated from the rest by a wall of concrete, localizing the effect of burnouts. The system resists water and gas seepage, a protection against electrolysis and manhole explosions.

No ordinary hazard can break through the protection of Orangeburg Fibre Conduit.

JOHNS-MANVILLE Inc., 296 Madison Ave. at 41st St., New York City
Branches in 61 Large Cities
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

Distributors

PACIFIC STATES ELECTRIC CO.
LOS ANGELES SAN FRANCISCO SPOKANE
PORTLAND OAKLAND SEATTLE

THE FIBRE CONDUIT CO. REG. U.S. ORANGEBURG PAT. ORANGE
JOHNS-MANVILLE SERVICE COVERS THE CONTINENT
Through—
Electrical Materials
FOR
Utilities
Jobber
Contractor
AND
Dealer

JOHNS-MANVILLE
SOLE SELLING AGENTS

Write Your Own Specifications

Suppose you wrote the specifications for your pole line hardware. You know the conditions of weather, of stress and strain and of installation problems met in pole line construction. You would demand the following to meet these conditions.

1. That all hardware must be double hot-dipped galvanized. That it must withstand the standard four immersion test which is equivalent to an atmospheric exposure of 35 to 40 years.

2. That all hardware must be of open hearth steel. That this steel have a tensile strength of 55,000 to 65,000 pounds per square inch. No re-melted scrap to be used.

3. That all nuts must accurately fit their respective threads. Hubbard and Company hold their factory word for word to the above general requirements. These specifications were laid down years ago for the protection of your transmission lines. That's why so many of the Pacific Coast Power Companies use Hubbard Pole Line Hardware.

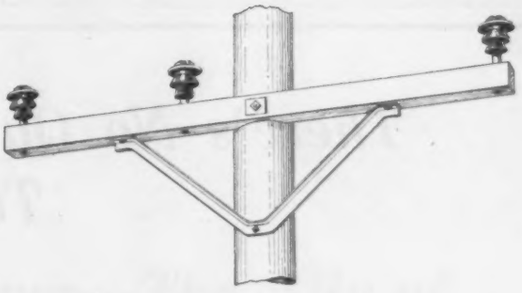
T. M. Reg. 1921

PACIFIC STATES
ELECTRIC COMPANY

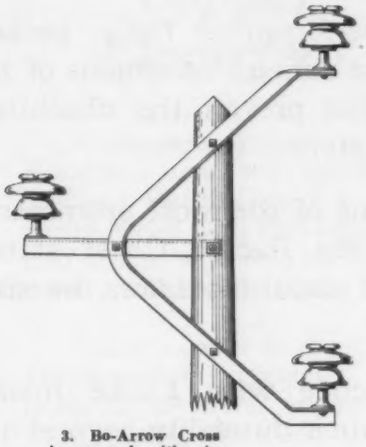
SAN FRANCISCO, LOS ANGELES, OAKLAND, PORTLAND, SEATTLE, SPOKANE

T. M. Reg. 1921

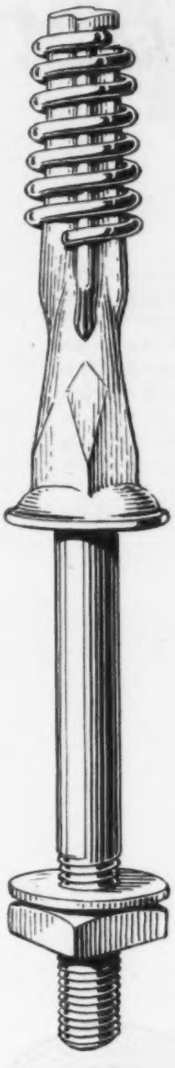
1. Hubbard Angle Steel Cross Arms Braces are of one piece construction. Made of open hearth steel, double hot dipped galvanized in pure zinc.



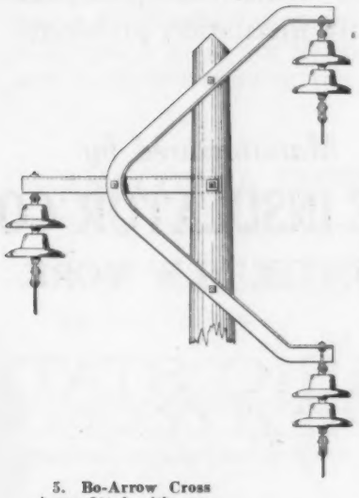
2. Hubbard Angle Steel Cross Arm installations give greater strength and rigidity than standard flat braces.



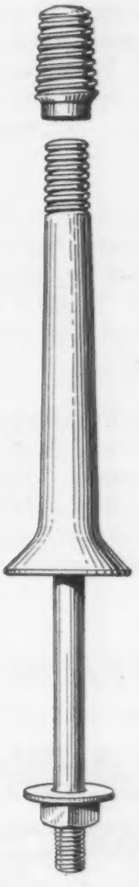
3. Bo-Arrow Cross Arms used with pin type insulators hold lines to a minimum width with a maximum ground clearance. No two wires in same horizontal plane.



4. Peirce Spring Thread Insulator Pins provide flexible seat for the insulator without use of cement or solid iron.



5. Bo-Arrow Cross Arms fitted with suspension type insulators permit use of longer spans without danger of wires swinging together.



6. Peirce Forged Steel Pins with Separable Thimbles of zinc or lead provide a firm, rigid seat for the insulator and absorb expansions due to temperature changes.

LOCKE INSULATORS

There's No Question --- They Specify Locke

Efficient performance for a period of years under the most difficult conditions of high voltage transmission has proven the absolute durability of Locke Insulators.

Recently one of the most prominent electrical engineers on the Pacific Coast stated that he "never worried about insulators, he simply specified LOCKE."

His experience with Locke Insulators had demonstrated their durability beyond question.

On the Pacific Coast, Locke Insulators are handled exclusively by the Pacific States Electric Company, and this organization offers you the services of their transmission department in connection with any insulation problems.

Manufactured by

LOCKE INSULATOR CORP.

VICTOR, NEW YORK

PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

Exclusive Pacific Coast Sales Agents

Quality Electrical Merchandise
THE MARK THAT MEANS
INSPECTED & CERTIFIED by
PACIFIC STATES ELECTRIC COMPANY
Chosen from the Markets of the World

T. M. Reg. 1921

Anaconda Copper is not Just Copper

ANACONDA
from mine to consumer
TRADE MARK

Copper---The Ally of Electrical Transmission

Anaconda Copper wire is not just copper. It is made from selected Cathode copper reduced in refining furnaces to 99.9% purity. When drawn into wire it tests to an electrical conductivity of 97.5% or better.

A kite string stretching skyward from the key in Benjamin Franklin's hand was the first power line to carry electrical energy. But the use of a wet string as a conductor of electricity ended with that experiment. Later experiments proved that copper wire was the ideal conductor of electricity and no better conductor has been found since.

Today copper is the true ally in electrical transmission. Developments in copper refining have parallelled progress made in electrical engineering. Refined copper of nearly 100% purity, rolled and drawn into Anaconda Copper Wire of better than 97.5% conductivity is carrying voltages as high as 220,000.

Anaconda Copper wire is recognized as a superior product by the great power companies of the West. It is preferred for its high purity and conductivity. For forty years the name Anaconda has meant prompt and dependable deliveries of copper wire to our Western States. It is mined and refined and made into wire in the West for Western power needs.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department **Conway Bldg., Chicago**

THE AMERICAN BRASS COMPANY
General Offices **25 Broadway, New York**

PACIFIC STATES
ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE

Distributors for the Pacific Coast

Hotpoint
ELECTRIC RANGES
1924 Models

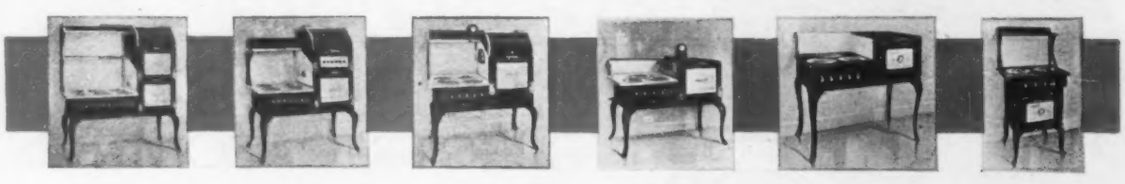
THE new 1924 models of Hotpoint Electric Ranges are of the same superior standard of design and construction that has always made Hotpoint products the outstanding leaders in the electric utilities field.

They also include the EXCLUSIVE HOTPOINT FEATURES which give users the highest degree of convenience and cooking service. These advanced improvements offer you unlimited opportunities for increasing your range sales.

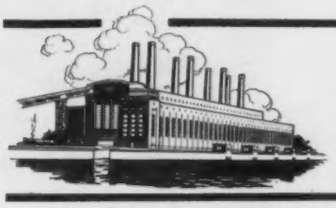
Five Exclusive *Hotpoint* Features

1. **Speed** The *six-inch, 1000 watt, Hotpoint "Speed Unit"* delivers a maximum heat on a surface which fits four out of every five utensils in the average home.
2. **Cleanliness** The *all-white enamel, Hotpoint cooking top,* with *cove corners,* without projections or inaccessible crevices, is kept clean and shining with a single wipe of a cloth.
3. **Control** The Hotpoint *"Time and Temperature Control"* without watching, starts and stops the cooking operation and *maintains* even and accurate oven temperature.
4. **Convenience** On Hotpoint ovens, the *counter-balanced shelf door* opens and closes at a touch. When open it serves as a shelf, indispensable in the handling of hot pans.
5. **Oversized Oven** The *internal design of Hotpoint ovens* provides a rack and heating unit arrangement which leaves a maximum space available for cooking in the 18x18x14 inch compartment.

Range distributors will recognize these as the comfort-giving, efficiency-increasing features which lighten the housewife's duties, and which are responsible for the ever-growing demand for electric ranges.



The Most Complete Line of Electric Ranges



POWER

Stone & Webster power stations designed and built, or now being built, total one and three-quarter million horse power—enough to operate the traction systems of New York, Chicago, Philadelphia, Detroit, Cleveland and St. Louis—our six largest cities.

Under construction is over 300,000 horse power. This is to supply Boston, Washington, Hartford, Lynn, Indianapolis, Fall River, Los Angeles and other cities.

Sixty public service corporations are served continuously by Stone & Webster engineers who make their plans and install their new generating and distributing equipment.

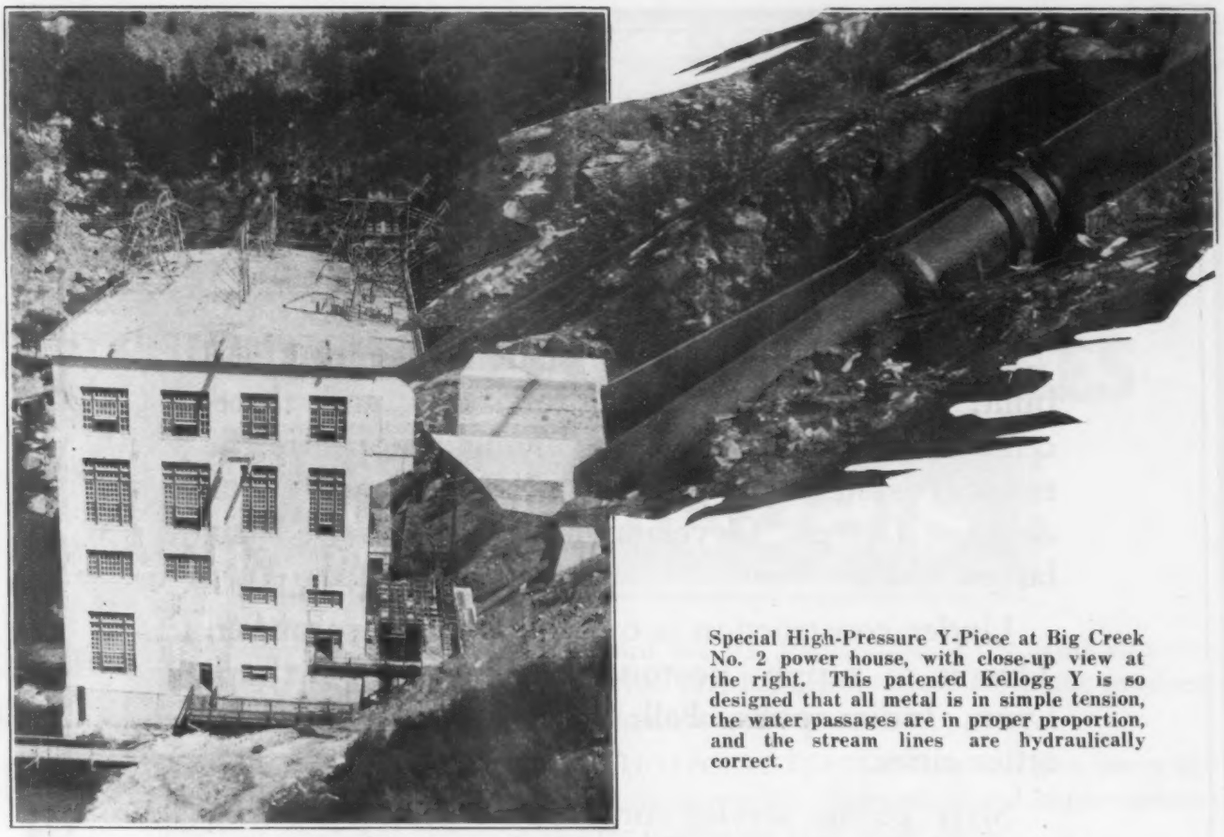
Stone & Webster engineers have examined and appraised properties to the total value of more than $4,500,000,000 including many of the country's foremost public utilities.

STONE & WEBSTER

INCORPORATED

DESIGN · BUILD
MANAGE
FINANCE

NEW YORK, 120 Broadway
SAN FRANCISCO, Holbrook Bldg.
CHICAGO, 38 S. Dearborn Street
PHILADELPHIA, Real Estate Trust Bldg.
BOSTON, 147 Milk Street



Special High-Pressure Y-Piece at Big Creek No. 2 power house, with close-up view at the right. This patented Kellogg Y is so designed that all metal is in simple tension, the water passages are in proper proportion, and the stream lines are hydraulically correct.

The Recognized Advantages of KELLOGG Pipe Lines

The success of Kellogg methods of penstock manufacture is founded upon basic facts drawn from varied experience in different parts of the world.

Design and Manufacture

Every scientific method of testing is applied to materials and processes; so that the finished Kellogg product maintains a uniform high standard of quality that is recognized throughout the world.

Installation Costs

The use of Kellogg bump and expansion joints aids in effecting erection economies that keep the overall cost of the installation at a favorably low level.

Operation and Maintenance

Better operating efficiencies, reduced friction loss, and low maintenance costs from year to year further emphasize the advantages of Kellogg Pipe Lines.

The M. W. Kellogg Company

140 Cedar Street **New York City**

Pacific Coast Representatives: Pelton Water Wheel Co., San Francisco

KELLOGG FORGE WELDED PIPE
FORGE WELDED CONTAINERS
POWER PLANT PIPING

ROME WIRE

ROME MAGNET WIRE

Uniform Quality

Of all Magnet Wire requirements uniform quality is the most important, and Rome experience, manufacturing processes, and final inspection and test assure absolute uniformity.

This uniformity exists throughout the various gauges, styles, and coverings and you can always depend on the same results from the same wire. There are no joints or splices to cause high spots or give trouble.

Rome Magnet Wire uniformity is proved by the way it works on the job, on both new and repair work, in application and in service.

ROME MAGNET WIRE

Supplied in all B. & S. gauges; round in single and double cotton or silk covered, enamel covered, enamel and silk or cotton covered; square in double cotton covered; rectangular in enamel or single or double cotton covered. All of uniform quality and on hand for prompt shipment.

Send for complete list of base prices, extras, sizes, spool sizes and weights. Address our nearest jobber, dealer, or office.

Write to Department B 6

ROME WIRE COMPANY: *Mills and Executive Offices:* ROME, NEW YORK

Diamond Mills: BUFFALO, N. Y.

Branches:

NEW YORK
50 Church St.

BOSTON
Little Bldg.

LOS ANGELES
J. G. Pomeroy,
336 Azusa St.

Atlantic Mills: STAMFORD, CONN.

CHICAGO
14 E. Jackson Blvd.

DETROIT
25 Parsons St.

2152-L

WIRE-ROME

ROPER
ELECTRIC RANGES

MAKING THE KITCHEN AS MODERN AS THE REST OF THE HOME

Roper Electric Ranges have made a record, in the hands of users, that has never been equaled. Roper Ranges have increased sales and good-will. Each customer has been pleased—and each pleased customer has passed on the good word of the absolute dependability, and extraordinary economy of the Roper, the only electric range with the ventilated oven, and direct heating contact.

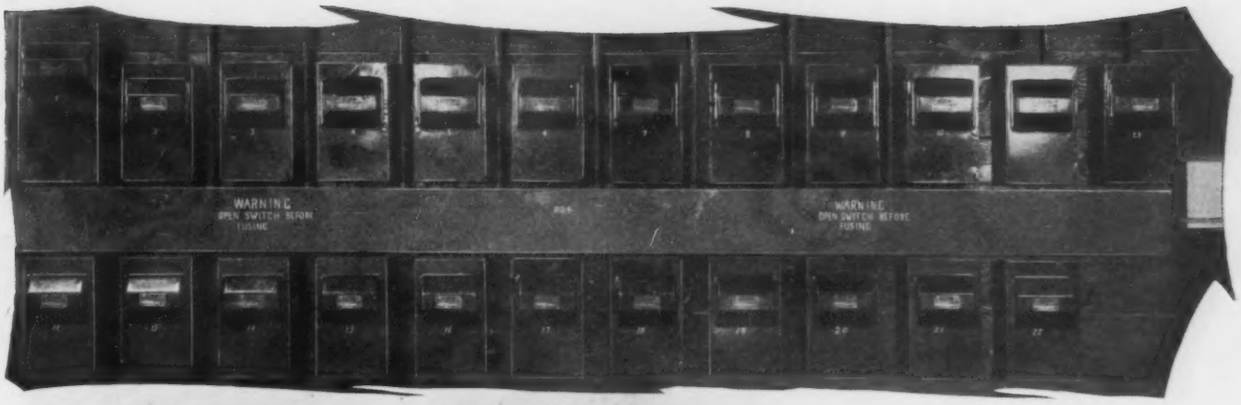
The illustration shown is one used in our national advertisements. Such advertising, working with your sales force, is a most valuable asset. Roper deserves to have, and will have, universal recognition. Write for our complete merchandising plan.

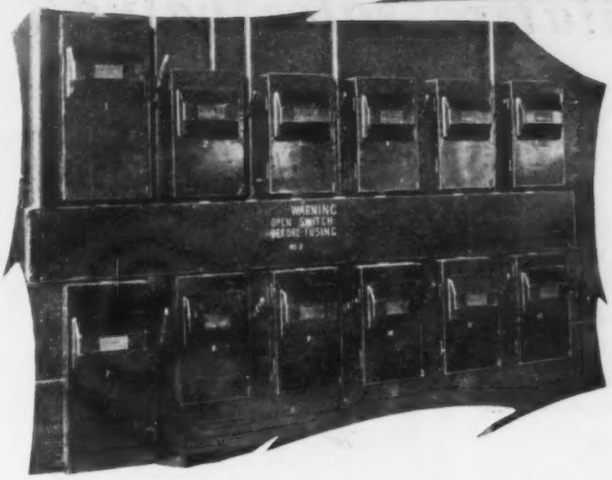
GEO. D. ROPER CORPORATION—ROCKFORD, ILLINOIS

Pacific Coast Branch: 768 Mission St., San Francisco, Calif.

ROPER
RANGES

BE SURE THE ROPER PURPLE LINE IS ON THE ELECTRIC RANGE YOU SELL





Three views of a complete T-V installation made by the Enterprise Electric Works in the San Francisco mill of the Reinhart Lumber & Planing Mill Company, providing safe individual control of the drive on every piece of machinery throughout the plant.

for Heavy Industrial Load Protection

You can rely upon Trumbull-Vanderpoel Safety Switches to handle all types of loads in western factories, mills, and shops.

The increasing number of complete T-V installations for power, light, and heat loads offers ample proof that "Protection Service" switches are safe and satisfactory in electrical operation and mechanical construction.

Write to the nearest office of our Western Sales Representatives for a copy of Safety Switch Bulletin No. 12. It will give you the complete details of the entire line.

Trumbull-Vanderpoel Electric Mfg. Co.

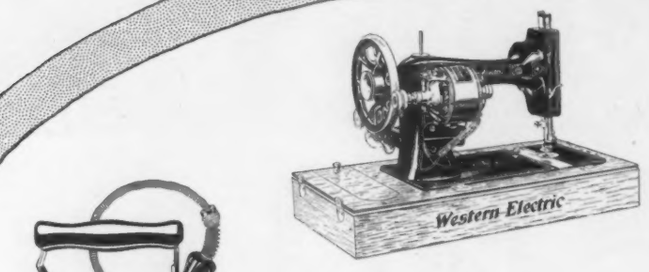
Bantam, Connecticut, U. S. A.

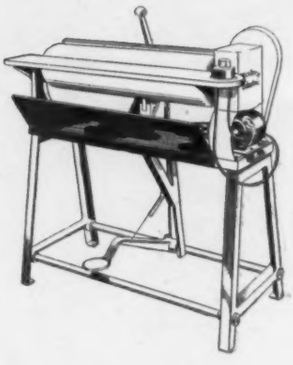
Western Sales Representatives

ALLIED INDUSTRIES, Inc.

455 Second Street	53 Fourth Street	532—1st Ave., South	1256 Factory Place
San Francisco	Portland	Seattle	Los Angeles

The only appliances





The Complete Line has big cumulative sales value!

The complete line of Western Electric appliances offers the dealer a big opportunity for building future sales that will require a minimum of sales effort.

When once the name has been established in the mind of the practical western housewife by the dependable operation of the first appliance purchased, she then becomes a live prospect for all of the other labor-saving Western Electric appliances that eliminate drudgery in the home.

The latest improvements make each of the Western Electric appliances a "best seller" that will help to make 1924 the biggest electrical year in history for the aggressive dealer who looks upon every customer as a prospect for *the Complete Line.*

1869 **Offices in all Principal Cities**

Western

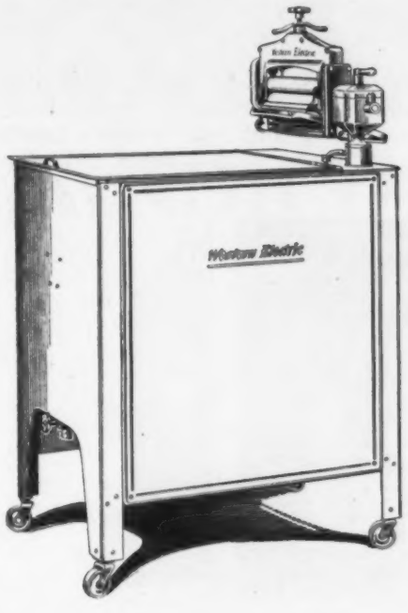
backed by ~~54~~ 55* years' electrical experience

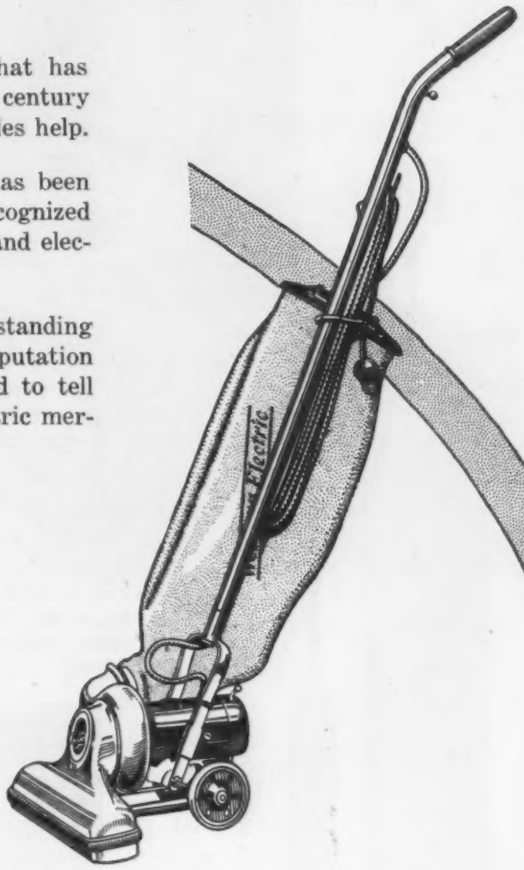
* Another year rolls by; another year added to the reputation of Western Electric.

A reputation for quality workmanship that has become better known every year for over half a century has real value that can be used as a decided sales help.

Since 1869 the Western Electric name has been growing in prestige; today it is universally recognized as the sign of a high standard of mechanical and electrical perfection.

You, as a dealer, can tie in with this long-standing reputation, and by so doing build a similar reputation for yourself. Our representative will be glad to tell you of the many advantages of Western Electric merchandising opportunities.



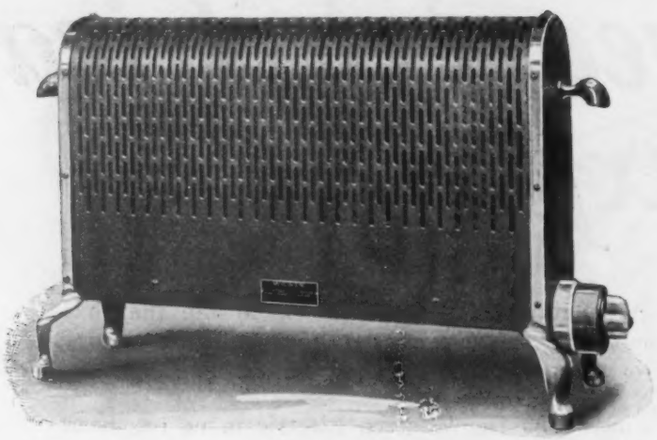


1924

Electric

WESIX Electric Heaters

Approved by the National Board of Fire Underwriters



3 1/3 K.W.
Radiant-Convection
Type

(Patented)

5 K.W. Automatic
Water Heater

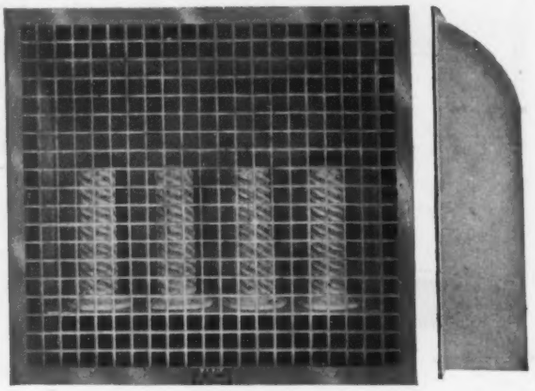
(Patented)

MILLIONS OF DOLLARS that should be adding to the revenue of the Western Power Companies for electric heating service, are being spent by consumers for less desirable fuel.

A small part of this same fuel converted to electricity in efficient central plants can be profitably distributed for electric heating without adding materially to the consumer's expense for heating, thus diverting tremendous sums into the electrical industry and materially improving load conditions while adding to the comfort and convenience of the consumer.

WESIX AIR HEATERS and Water Heaters, operating on rates of 1½ to 2 cents per kw. hr., prove that lower rates are not essential if proper care is used in selecting the type and capacity of the heaters.

A 1½ cent rate for water heating when a WESIX WATER HEATER is used in connection with a properly covered boiler is as cheap for the consumer as a ½ cent rate where a poorly constructed heater is used in connection with a boiler not properly covered.



3 1/3 K.W. Radiant-Convection Wall or Fireplace Type
(Patented)

Manufactured by the Patentee

W. WESLEY HICKS

215 Rialto Building
San Francisco

4536 Hollywood Blvd.,
Los Angeles

In the Main Lobby of the Canterbury Hotel in San Francisco, this special Magicoal fireplace provides a cheery atmosphere through the whole day and evening at a cost that is almost negligible.

MAGICOAL

REG. U. S. PAT. OFF.

—the electric fire that is bringing Firelight Happiness to the West

The glowing and flickering of real coal is so perfectly simulated by Magicoal that it gives out all of the cheerfulness of a real fire with none of its troubles—and at a very low operating cost.

It can easily be installed in any type of fireplace with or without a flue. Wherever desired, Magicoal can be supplied with electric heating units which operate with the same efficiency as any other type of electric air heater.

Contractors and Dealers will find an almost unlimited western market for Magicoal in hotels, clubs, theaters, offices, schools, and homes. Write for full information concerning the wide variety of styles and the excellent Magicoal merchandising opportunities.

Distributors for U. S. A.

Mayer Bros. & Bramley, Inc.

417 West 28th Street
New York City

Western Distributors:

Electric Material Company

589 Howard Street, San Francisco
Hinckley Bldg., Seattle
Consolidated Realty Bldg., Los Angeles

Maxims
for
Merchants
No. 1

THE QUICKEST and most satisfactory profits come from selling people what they want—nationally advertised merchandise.

EDISON

MAZDA LAMPS

A GENERAL ELECTRIC PRODUCT

The Autobiography of a Customer

EPISODE No. 1

In which I knock over the bridge lamp

MY BIRTH as a customer occurred on the day I knocked over the bridge lamp.

I was running the vacuum cleaner over the living-room—and in stepping back, I sent the bridge lamp crashing to the floor. It was Jim's favorite, so I was more than a little upset. Carefully I picked it up and to my delight found that only the bulb* was broken.

A few blocks from the house I found an electrical shop. I walked in and asked for a bulb.* After showing me several which didn't look right, the dealer fished one out which, so far as I could see, was exactly like the bulb* I had broken.

While he was wrapping it, I mentioned that I had never heard of this particular kind before. He said, "These people don't believe in advertising. They put the money into the product instead."

After supper that night I heard from the other room a muttered, "What the ——!", followed by Jim's raised voice asking, "What's happened to this lamp?" I dashed frantically into the room and asked what was the matter. "Something seems to have gone wrong with the lamp," he said, "the blamed thing doesn't give enough light to read by." Then I told him that I had broken the bulb,* but had got a new one. I explained what the man had said about advertising. Jim looked surprised and seemed inclined to laugh. "Don't let anybody kid you about saving money on advertising. Do you know why Edison MAZDA Lamps can be sold so cheaply?" "No," I said. "Because," said Jim, "advertising does the work of an army of salesmen, talking to thousands where a salesman would talk to one. This saves selling expense and creates demand that makes lower manufacturing costs possible through quantity production. How long did it take him to sell you this lamp?" "Oh, about ten minutes." "Well, if it had been an Edison MAZDA Lamp, no explanation or searching would have been necessary. The Edison Lamp Chart would have told at once the lamp you needed. A national advertiser *must* have a good product or his advertising soon becomes a waste of money. Advertising is the best possible guarantee of quality."

I didn't say anything, but what Jim had said started me on a system of buying, the first and inflexible rule of which is to give preference to the advertised article.

* She meant *lamp*

Build a Larger Water-Heater Load with INSULEX

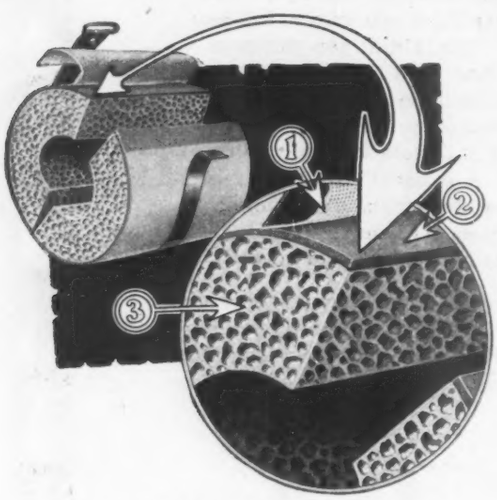
The economy of Insulex Boiler Jackets will appeal to additional thousands of consumers without change of present rates.

Careful engineering tests of electric water-heating practice prove that more heat is lost through radiation from a boiler without covering than is actually needed to heat the water.

The operation of electric water heaters by this wasteful method makes many prospective consumers look upon hot-water service as a luxury beyond their means.

A boiler covered with Insulex has approximately four times the heat retention efficiency of a galvanized iron boiler without covering; the saving of wasted heat will pay for the Insulex Jacket in a very few months.

Central Stations, Jobbers, and Contractors can greatly extend their water heater market by using Insulex Boiler Jackets on every installation, commercial as well as in homes.



Why INSULEX Retains Heat

1. Heavy Canvas Casing—can be enameled or painted to harmonize with surroundings.
2. Felt Paper—a binder providing a smooth base for the canvas casing.
3. INSULEX—the boiler and pipe insulation that reduces heat losses to a minimum. Minute, individual air-cells practically eliminate air circulation.

INSULEX

is the best boiler insulation because

—boiler leaks will not injure it.

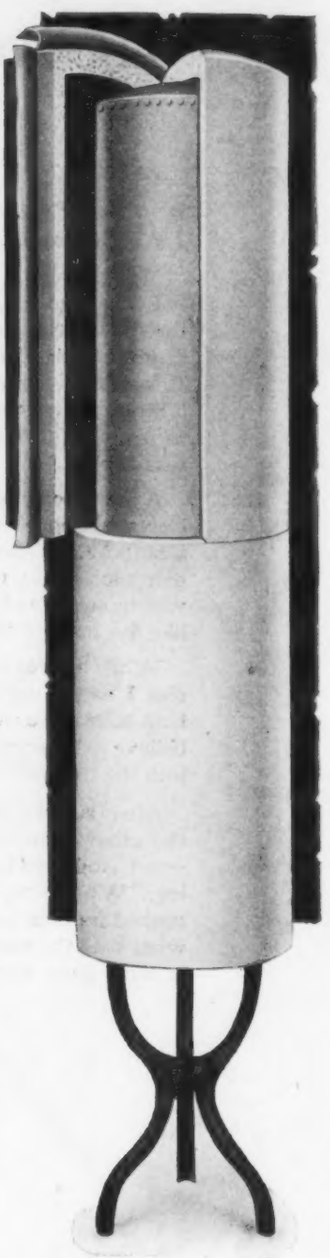
—it is easy to install.

—it will not sag or loosen on the boiler.

—it will not mould or become unsanitary.

—it has no odor when the boiler is hot.

—it will last a lifetime.



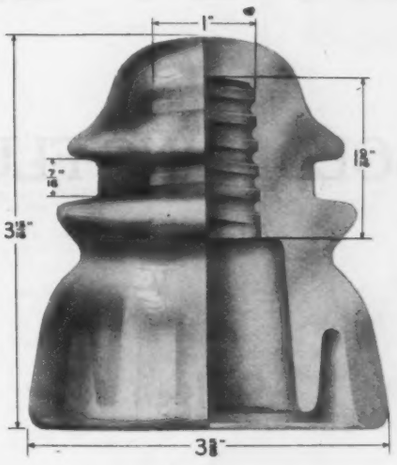
We make all types of boiler and pipe insulation for standard or special installations. Send for complete information, or ask your jobber.

Western Insulex Company

Factory
360 Adeline Street
Oakland, California

Sales Office
Rialto Building
San Francisco, California

LYNCHBURG



No. 44

GLASS INSULATORS

Lynchburg Glass Insulators, possessing all the characteristics that have made glass insulators the standard for telephone and telegraph lines, are now available on the Pacific Coast.

MANUFACTURED BY

LYNCHBURG GLASS CORPORATION
LYNCHBURG, VIRGINIA

Pacific Coast Distributers

Baker-Joslyn Company

RELY ON LOS ANGELES SEATTLE SAN FRANCISCO SERVICE

Second & Bryant Sts.
SAN FRANCISCO

330-332 Azusa St.
LOS ANGELES

2424-28 First Ave. So.
SEATTLE

Distributers
Hot Galvanized Pole Line Hardware
Wood Poles, Cross Arms and Pins
Construction and Linemen's Tools
Porcelain and Glass Insulators
Porcelain Knobs, Tubes and Cleats
Insulated and Bare Copper and Iron Wires
Rigid Iron Conduit and Fittings
Flexible Metallic and Non-metallic Conduit and Armored Conductors
Switches, Switchboards and Fuses
Insulating Materials

BURNLEY

SOLDERING FLUX

Always Best

Paste • Salts • Sticks

Burnley Soldering Paste spreads out and *follows the heat,* making fast work easy. It is non-corrosive, the simplest and handiest of all fluxes and the most economical.

ORDER THRU YOUR JOBBER

MANUFACTURED BY
THE BURNLEY BATTERY & MANUFACTURING COMPANY
NORTH EAST, PA., U. S. A.

Pacific Coast Distributers

Baker-Joslyn Company

RELY ON LOS ANGELES SEATTLE SAN FRANCISCO SERVICE

Second & Bryant Sts.
SAN FRANCISCO

330-332 Azusa St.
LOS ANGELES

2424-28 First Ave. So.
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Distributers
Hot Galvanized Pole Line Hardware
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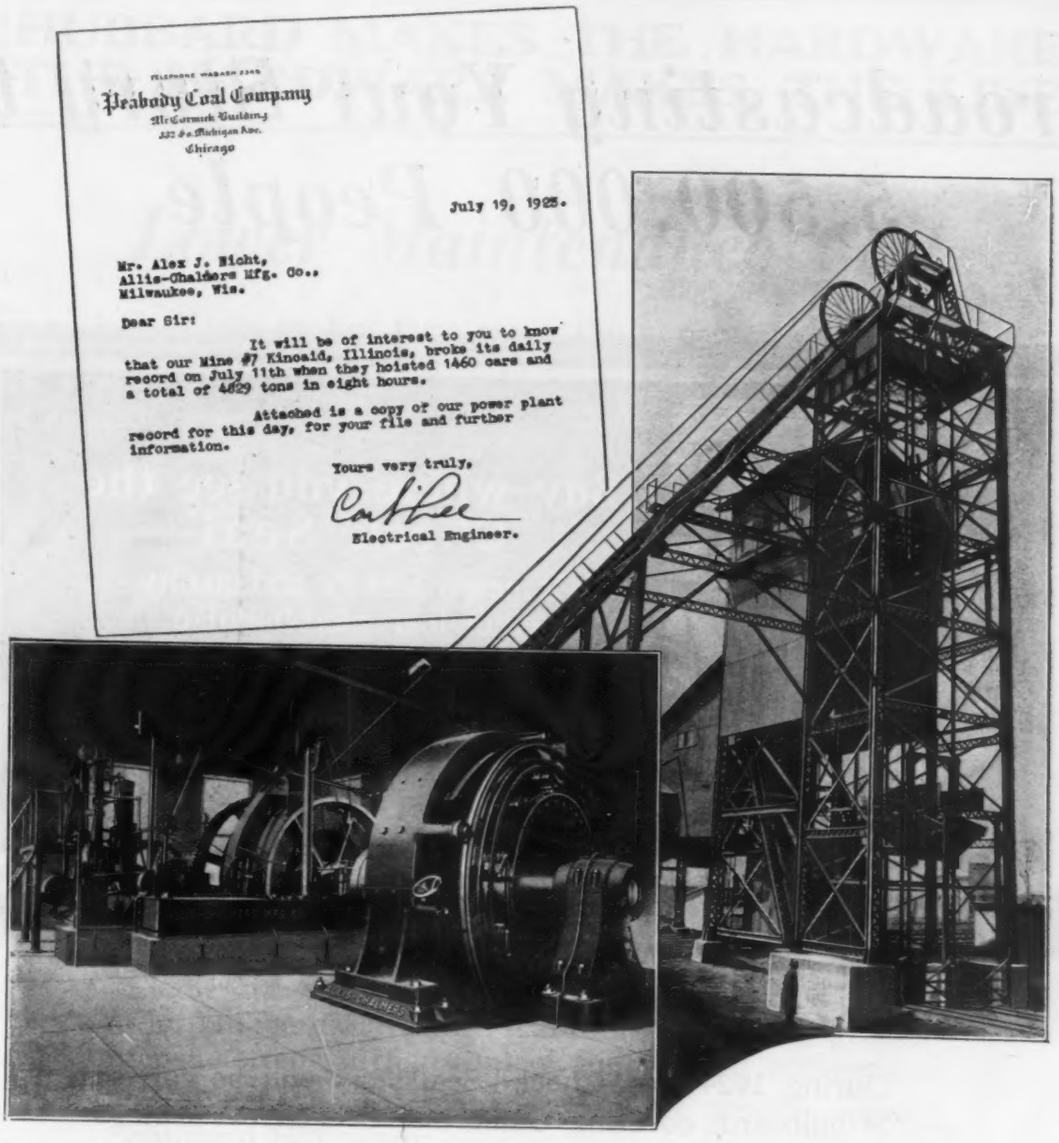
Flexible Metallic and Non-metallic Conduit and Armored Conductors
Switches, Switchboards and Fuses
Insulating Materials



Peabody Coal Company
McCormick Building
332 So. Michigan Ave.
Chicago

July 19, 1923.

Mr. Alex J. Nicht,
Allis-Chalmers Mfg. Co.,
Milwaukee, Wis.

Dear Sir:

It will be of interest to you to know that our Mine #7 Kincaid, Illinois, broke its daily record on July 11th when they hoisted 1460 cars and a total of 4829 tons in eight hours.

Attached is a copy of our power plant record for this day, for your file and further information.

Yours very truly,

Electrical Engineer.

Is Your Hoisting Equipment Making Records?

Contract capacity for the hoist referred to in the above letter was 4000 tons in 8 hours. Excess capacity such as this denotes correct proportioning of both mechanical and electrical units and sturdy design throughout. This permits of increased capacity without increased expenditures for new equipment.

This is also one of the most economical electric hoists in the Illinois Coal Field.

We Can Help You To Obtain Like Results

ALLIS-CHALMERS

MILWAUKEE. WIS. U. S. A.

Broadcasting Your Story to 5,500,000 People

During 1924 the "Check" Seal story will be carried on 724 billboards covering California, Oregon, Washington and portions of Idaho and Nevada.

With three changes of copy this will give a total of 2172 displays for the year, carrying your message to more than 5,500,000 prospective buyers on the Pacific Coast.

T. M. Reg. 1921

PACIFIC STATES
ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE

Distributors for the Pacific Coast

T. M. Reg. 1921

"HUBBARD MAKES THE HARDWARE THE HARDWARE MAKES THE LINE"

Lower Maintenance Cost

Daily routine tests prove the superiority of Hubbard Pole Line Hardware.

Made of new open hearth steel to the most exacting standards, Hubbard products are demonstrating their ability to last indefinitely, reducing pole line maintenance costs to the minimum.

For instance 5/8 inch Double Arming Bolts under these tests prove to have a guaranteed tensile strength of 10,000 pounds and an actual average of 14.912 pounds.

When bent through an arc of 90 degrees around a diameter equal to that of the bolt there is no fracture of iron or steel.

On the galvanizing test they will stand six to eight acid immersions, which is the equivalent of more than 40 years exposure to the most severe weather conditions.

One of the largest Central Station users of Pole Line Hardware recently conducted tests which proved that Hubbard Hardware had more than 25% greater tensile strength than that of the nearest competitor.

For the lowest cost per unit of service specify Hubbard Hardware.

HUBBARD & COMPANY

Pittsburgh, Pa.

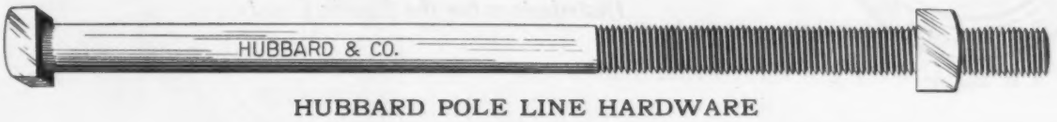
T. M. Reg. 1921

PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

T. M. Reg. 1921

Distributors for the Pacific Coast



HUBBARD POLE LINE HARDWARE

LOCKE INSULATORS

Insuring Steady Industrial Development

When the foremost power engineers of the Pacific Coast specify Locke Insulators on their power lines, they are specifying insulator efficiency.

Starting with the Southern California Edison Company's system in 1899, the Locke Insulator Corporation has met every phase of industrial development in the West with efficient insulators.

From the comparatively high voltage of those days of 60,000 volts to the 220,000 supervoltages of today, Locke engineers have produced insulators whose efficiency has been demonstrated beyond question.

On the Pacific Coast, Locke insulators are sold only by the Pacific States Electric Company who carry large stocks of various types of insulators to take care of all local needs and so insure unceasing development.

Manufactured by

LOCKE INSULATOR CORP.

VICTOR, NEW YORK

Quality Electrical Merchandise — Chosen from the Markets of the World — THE MARK THAT MEANS INSPECTED & CERTIFIED by PACIFIC STATES ELECTRIC COMPANY

T. M. Reg. 1921

PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

Distributors for the Pacific Coast

Anaconda Copper is not Just Copper

ANACONDA
from mine to consumer
TRADE MARK

Anaconda Copper Wire Is Not Just Copper

Anaconda Copper wire is not just copper. It is made from selected Cathode copper reduced in refining furnaces to 99.9% purity. When drawn into wire it tests to an electrical conductivity of 97.5% or better.

All copper wire may look the same, but there is a vast difference when quality is considered. One copper wire may appear to be just as good as another, but put it to the test and it would fail—impurities would cause its inefficiency.

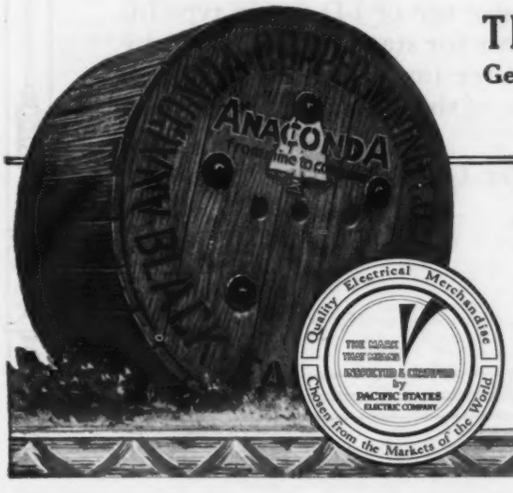
For over forty years the Anaconda Copper Mining Company has devoted every effort and the skill of scientists to the development of Anaconda Copper Wire,—a half century of service to industrial advancement.

Engineers throughout the West who rate a product on its performance, have placed the stamp of approval on Anaconda Copper Wire, for many of the large power companies specify it.

Electrolytic refining produces Cathode Copper of 99.98% purity, which is rolled and drawn into copper wire of over 97.5% conductivity — the leader of the power transmission field.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department Conway Bldg., Chicago

THE AMERICAN BRASS COMPANY
General Offices 25 Broadway, New York

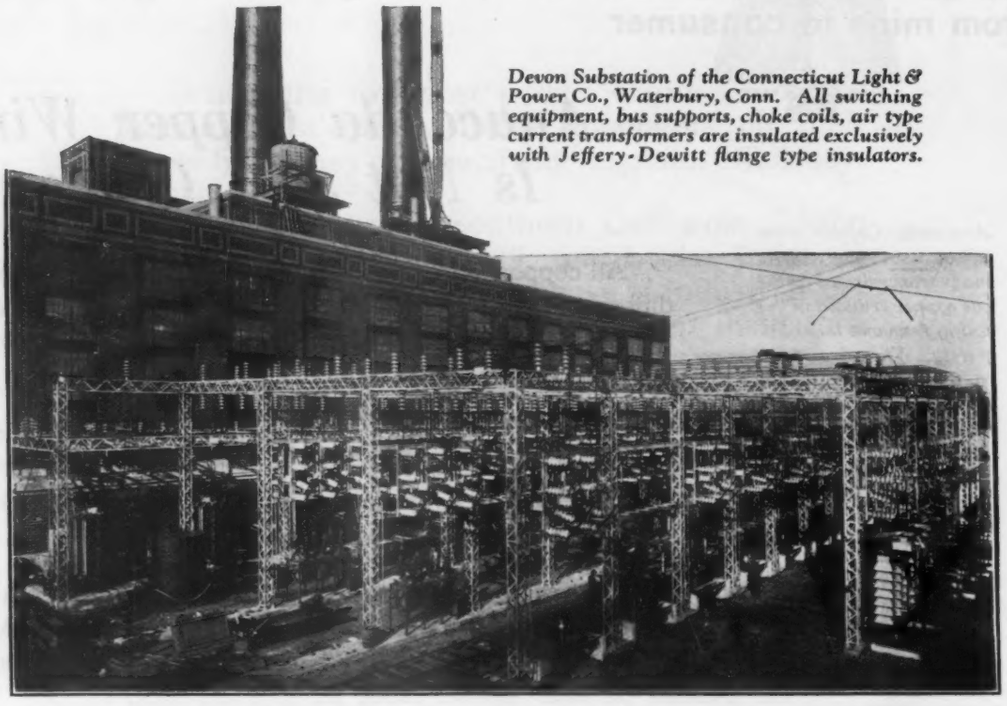


PACIFIC STATES
ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE

Distributors for the Pacific Coast

Select Insulator Designed To Do The Work Required



Devon Substation of the Connecticut Light & Power Co., Waterbury, Conn. All switching equipment, bus supports, choke coils, air type current transformers are insulated exclusively with Jeffery-Dewitt flange type insulators.

J-D flange insulators are, naturally, a preferred investment when the heavy duties of outdoor and indoor station equipment are under consideration.

Good practice and wise economy demand an insulator made to stand up under loads and impacts never contemplated in transmission service.

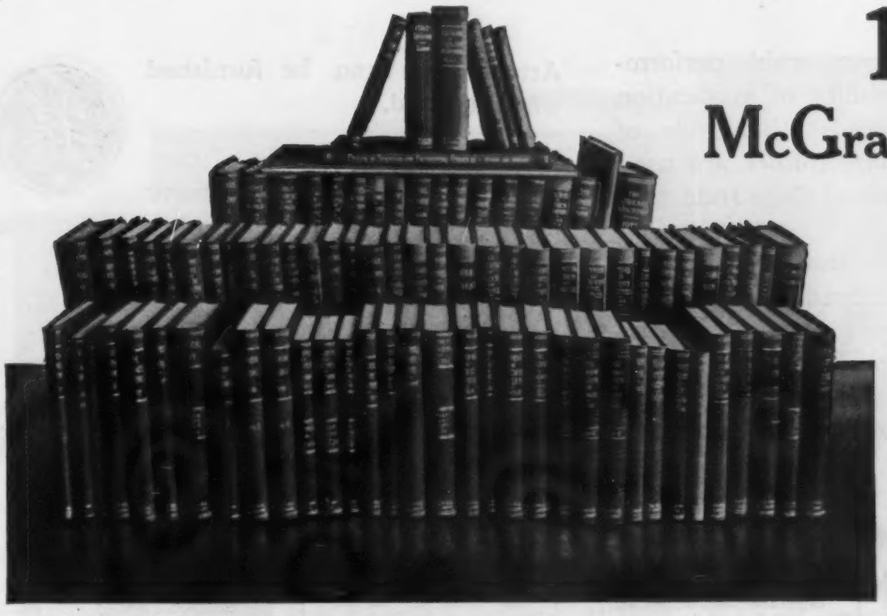
J-D flange insulators are very logically favored by engineers because they are especially designed to meet these severe requirements. For permanency and dependability, there is nothing on the market today to equal this rugged product.

There is no better evidence of the truth of this statement than the exclusive use of J-D flange type insulators for station equipment by the more important power companies of this country.

Jeffery-Dewitt Insulator Company
Kenova, W. Va.

Executive Sales Offices: 50 Church Street, New York City

JEFFERY-DEWITT INSULATOR CO. KENOVA, W.VA. U.S.A.



1923 McGraw-Hill Books

During 1923, we published 89 new books, including 12 revised editions of standard works. These books are shown in the accompanying illustration.

It is not so much the number of our new books that we speak of, however, as the character and variety of these books.

The books listed below range all the way from practical books for the operator to advanced and specialized treatises for the engineer—from books on business to books on scientific agriculture.

Throughout, we believe they maintain the high standard of McGraw-Hill books. They represent the best in the new literature of applied science and business.

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370 Seventh Avenue, New York

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McGraw-Hill Book Co., 370 Seventh Avenue, New York, N. Y.

You may send me on 10 days' approval.....

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.....

.....

I agree to pay for the books or return them postpaid within 10 days of receipt.

Signed .....

Address .....

Official Position .....

Name of Company .....

(Books sent on approval to retail purchasers in the U. S. and Canada only.) O-2-15-24

BECAUSE of their incomparable performance, and their flexibility of application for general industrial needs—thousands of *G-E Hand Starting Compensators* are used today for controlling Squirrel Cage Induction Motors.

Their construction is such that they can be installed easily, inspected readily, and operated with convenience and economy. Enclosing cases for all live parts provide safety for operators, and prevent tampering by others. Disconnecting Switches and Ammeter Attachments can be furnished where desired.

Below are given details of construction which embody many new electrical and mechanical features—and insure safety throughout.

General Electric Company

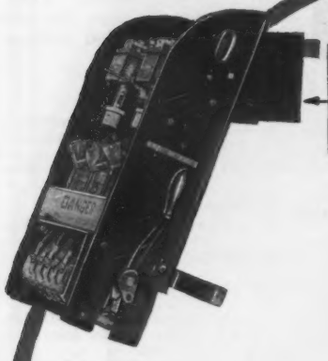
Schenectady, N. Y.

Sales Offices in all large cities

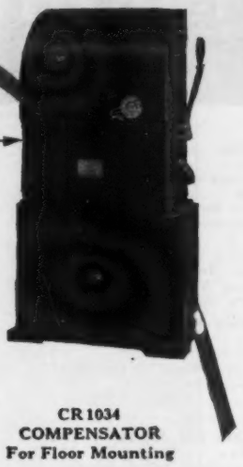
Construction Details

Separable conduit wiring box which forms top support facilitates making conduit and electrical connections.

All parts are enclosed. Provision is made for attaching a padlock to lock the cover and the oil tank in place.



CR 1034 COMPENSATOR For Wall Mounting



CR 1034 COMPENSATOR For Floor Mounting

A push-button is provided for convenience in stopping. The mechanism of the button is such that the starting switch is automatically tripped upon removing the compensator cover.

Relays, push-button mechanism, and under-voltage protection device are mounted inside of the case where they are protected but readily accessible upon lifting off the front cover.

Two inverse-time overload relays provide effective protection against all overloads liable to overheat the motor. They do not unnecessarily stop production upon the appearance of peak overloads of short duration.

Three compensator coils are used for three-phase and two for two-phase. This gives balanced starting-currents and the maximum torque per ampere line current.

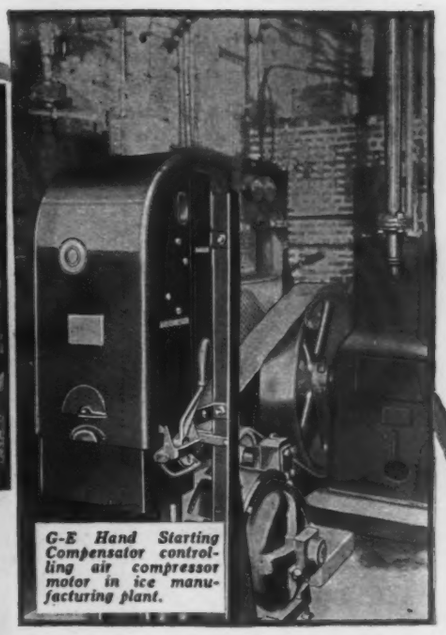
The oil tank is so constructed that it may be lowered to catch the dripping oil when inspecting the switch. It may be completely removed when desired.

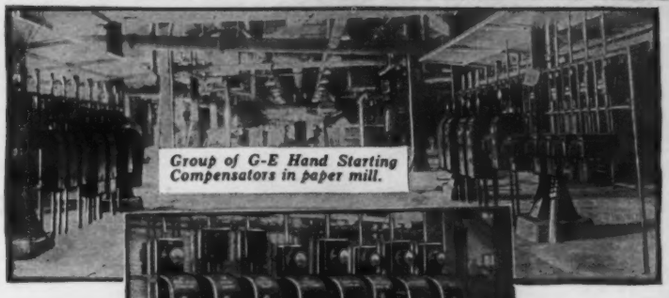
The operating handle must be thrown to the starting-position before it can be thrown to the running-position. The mechanism necessitates quick movements, which prolong the life of the switch contacts.

CR 1034 COMPENSATOR WITH FRONT COVER REMOVED Wall Mounting Type

GENERAL

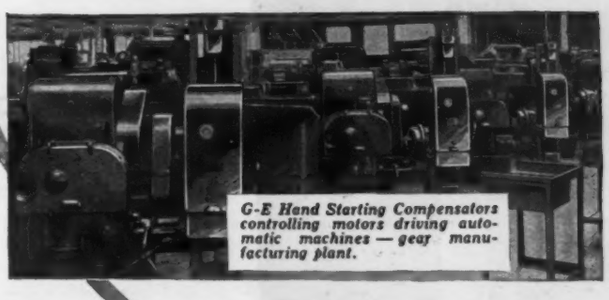
Battery of 7 G-E Hand Starting Compensators, with Ammeter Attachments, controlling pump motors.


G-E Hand Starting Compensator controlling air compressor motor in ice manufacturing plant.

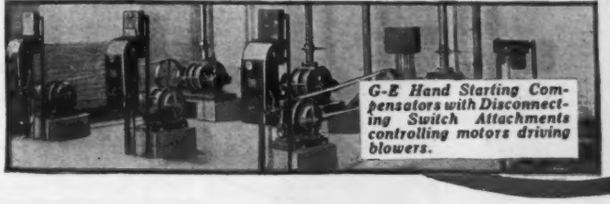

Group of G-E Hand Starting Compensators in paper mill.

G-E Hand Starting Compensators, with Ammeter Attachments, controlling wet end paper machine auxiliaries.

5 G-E Hand Starting Compensators, with Ammeter Attachments, controlling weave room motors in cotton mill.

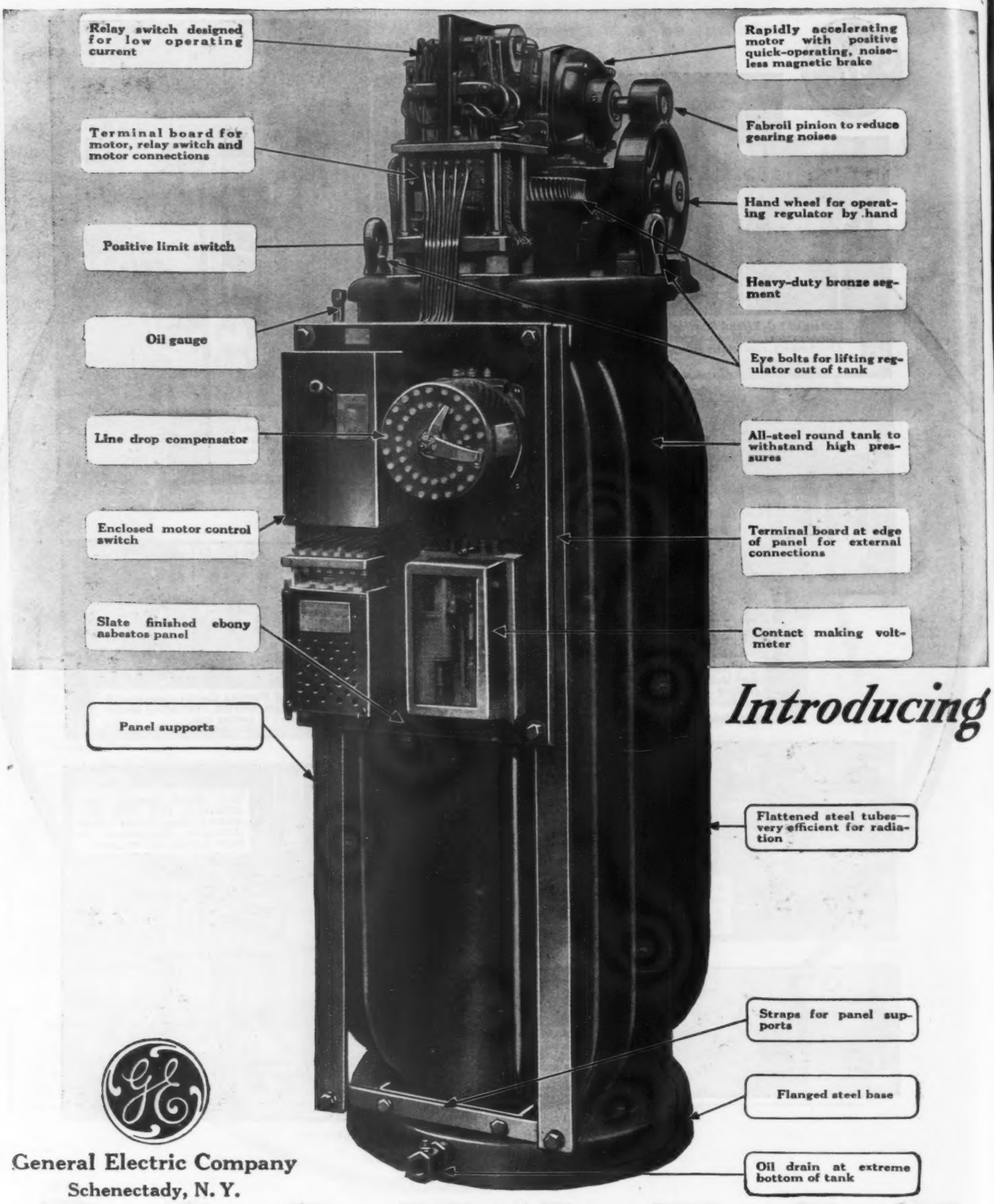

G-E Hand Starting Compensators controlling motors driving automatic machines — gear manufacturing plant.

G-E Hand Starting Compensators, with both Disconnecting Switch and Ammeter Attachments, in rope manufacturing plant.


G-E Hand Starting Compensators with Disconnecting Switch Attachments controlling motors driving blowers.

43A-87

ELECTRIC

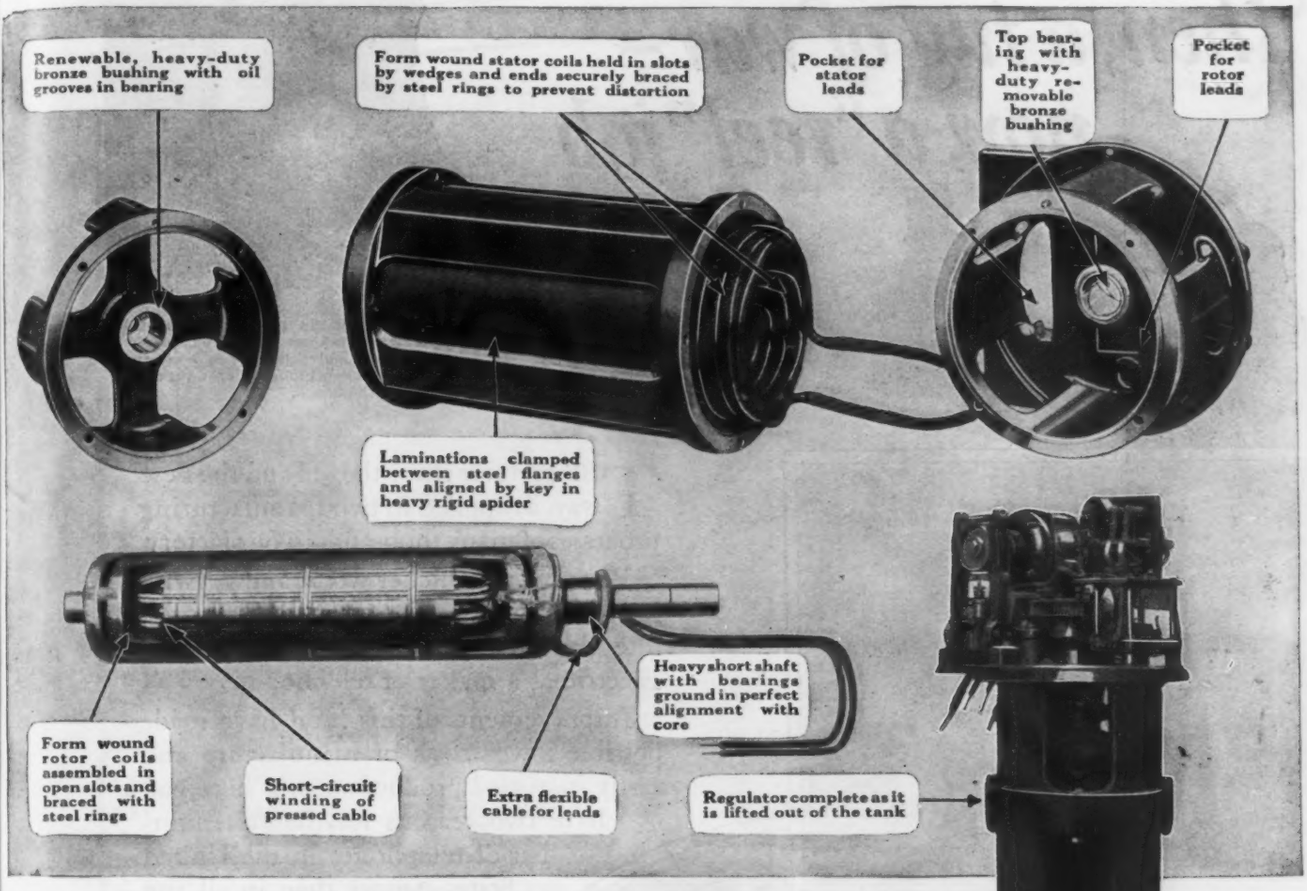

Relay switch designed for low operating current
Terminal board for motor, relay switch and motor connections
Positive limit switch
Oil gauge
Line drop compensator
Enclosed motor control switch
Slate finished ebony asbestos panel
Panel supports
Rapidly accelerating motor with positive quick-operating, noiseless magnetic brake
Fabroil pinion to reduce gearing noises
Hand wheel for operating regulator by hand
Heavy-duty bronze segment
Eye bolts for lifting regulator out of tank
All-steel round tank to withstand high pressures
Terminal board at edge of panel for external connections
Contact making voltmeter
Flattened steel tubes—very efficient for radiation
Straps for panel supports
Flanged steel base
Oil drain at extreme bottom of tank

Introducing

General Electric Company
Schenectady, N. Y.

23 to 115 kv-a.

GENERAL


Renewable, heavy-duty bronze bushing with oil grooves in bearing
Form wound stator coils held in slots by wedges and ends securely braced by steel rings to prevent distortion
Pocket for stator leads
Top bearing with heavy-duty removable bronze bushing
Pocket for rotor leads
Laminations clamped between steel flanges and aligned by key in heavy rigid spider
Heavy short shaft with bearings ground in perfect alignment with core
Form wound rotor coils assembled in open slots and braced with steel rings
Short-circuit winding of pressed cable
Extra flexible cable for leads
Regulator complete as it is lifted out of the tank

the New G-E Induction Regulator

Intensive work of several years on a new design of induction voltage regulator has culminated in this superior product. Throughout this development the following important considerations have been kept in mind:

Increased factor of safety by using a round all-welded boiler plate tank to withstand more effectively short-circuit stresses.

Increased rigidity of the mechanical structure to minimize noise.

Improved bracing of coils to prevent insulation troubles due to line short circuits.

Increased accessibility of the operating mechanism.

Improved voltage regulation by more rapidly correcting voltage changes.

If you have not already received literature giving a description of this new design, tell the nearest G-E Sales Office.

Pacific Coast Sales Offices

San Francisco — Los Angeles
Portland — Seattle
Spokane — Tacoma

Rocky Mountain Sales Offices

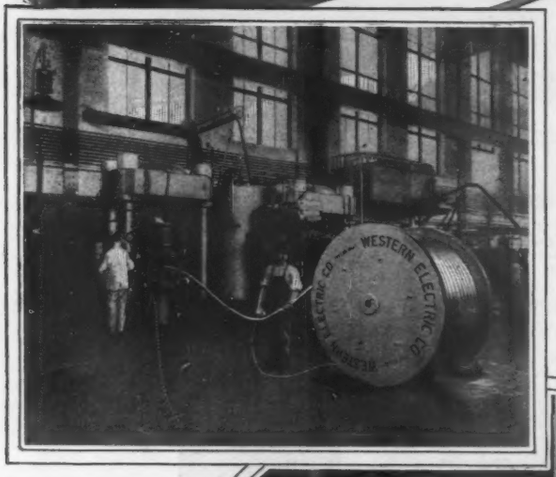
Denver — Salt Lake City

33B-45

ELECTRIC

Then, a tug of war— now, a "reel" job

HEAVE, HO! In the old days, from eight to sixteen men were needed in the factory to pull a single telephone cable core into lead pipes—which, soldered together, formed the sheath.



THE pictures show the old and the new way, as applied to two manufacturing processes of many thousands in our factory

Better work, quicker work, and yet with fewer men needed for each job—progress like this marks the history of Western Electric as a maker of telephones.

Improvements of this kind have made possible lower costs of manufacture and vastly increased production, and here you have two reasons for the vast number of telephones in the United States—more than in all the rest of the world.

HOW IT'S DONE TODAY. Now two men, operating this lead press, can cover more cable than the sixteen did the old way — and what's more, they do it better

MOLDING TRANSMITTER FACES the old way. Another case of many men producing a small output—with much of it failing to meet the high standard required.

THE TRANSMITTER FACE TODAY. One man produces more than the crew of yesterday, and with a far higher percentage of perfect pieces.

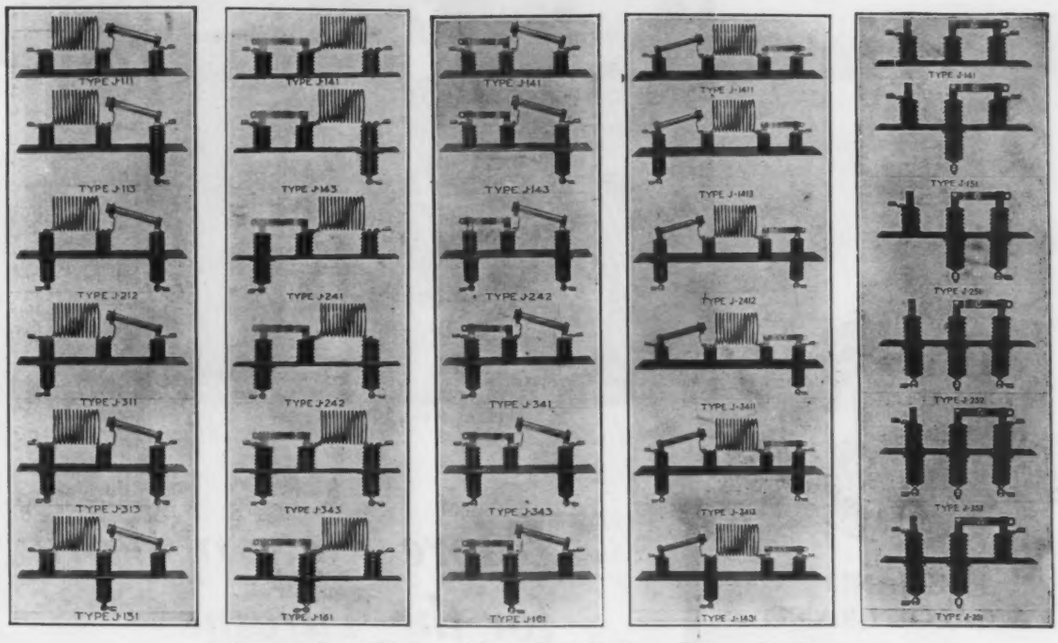
Western Electric

SINCE 1869 MAKERS OF ELECTRICAL EQUIPMENT

HIGH TENSION EQUIPMENT

UNIT TYPE UNIT TYPE UNIT TYPE UNIT TYPE UNIT TYPE

The Buying Habits of an Industry



A Few of the 1500 Assemblies of Unit Type Indoor Equipment

NOT long ago central stations habitually bought high tension disconnects, fuses, choke coils, bus supports, substation equipment, etc., under the general contract for the generating and transformer equipment. Today, many of them buy DELTA-STAR "Unit Type" switching equipment on a separate contract—

And It Pays to Do It!

DELTA-STAR ELECTRIC CO., 2433-61 Fulton Street, Chicago, Illinois

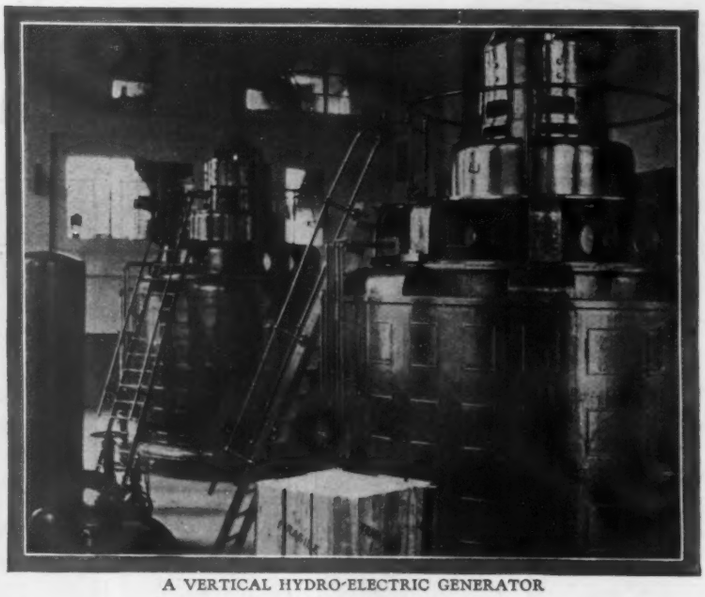
Manufacturers of High-Tension Equipment

LOS ANGELES	SALT LAKE CITY	SAN FRANCISCO	SEATTLE
W. W. Kirk	L. Brandenburger	W. W. Kirk, Representative	W. R. Hendrey
212 I. W. Hellman Bldg.	419 Dooly Bldg.	F. J. Gleiss, Manager	Hoge Bldg.
		193 Second Street	

DELTA-STAR

The Standard of Comparison

UNIT TYPE INTERCHANGEABLE PARTS



A VERTICAL HYDRO-ELECTRIC GENERATOR

CALOL BRAND
LUBRICATING OILS
STANDARD OIL COMPANY

DEMAND
A CALOL BRAND

For Internal Lubrication of Steam Cylinders

Calol Cylinder Oils
Calol Valve Oil
Calol H. P. Cylinder Oil

For High Speed Service and Exacting Conditions

Calol Engine Oil
Calol Dynamo & Motor Oil

For the Exacting Service of Steam Turbines

Calol Turbine Oil
Calol Turbine Oil Heavy

For Bearing Lubrication of Engines and Shafting under all conditions of Speed, Temperature, Size and Type of Application

Calol Engine Oil
Calol Red Engine Oil
Calol Heavy Red Engine Oil
Calol Heavy Red Journal Oil

More Hours of Work for the Turbine

Many of the interruptions to service, caused by turbine breakdowns and replacements, can be overcome by Correct Lubrication.

Continuous correct lubrication requires the quick separation from water and resistance to emulsification uniformly possessed by CALOL Turbine Lubricants. They may be filtered and reused again and again.

CALOL Lubricants of known dependability will be delivered promptly from a nearby branch station on your order.

Our Board of Lubrication Engineers has a field member who will gladly demonstrate Correct Lubrication in your plant.

STANDARD OIL COMPANY
(California)

THE "BULL DOG"

ASSEMBLED SPLIT KNOB

Made and sold under license,
U. S. Patent, Feb. 3, 1920.

"Has a Grip Like Its Namesake"

Five Points of Superiority:

1. Centering projection on the top, strengthening the point of greatest strain.
2. Recess in the bottom piece. Most other knobs are recessed in the top, weakening the knob at a point of great strain.
3. Cement coated nail, ¼ inch longer than nail usually used.
4. Genuine leather washer. Not fibre.
5. Metal washer on nail. Does away with crimping which weakens the nail.

MANUFACTURED BY
ILLINOIS ELECTRIC PORCELAIN CONPANY
MACOMB, ILLINOIS

Pacific Coast Stocks Carried By

BAKER-JOSLYN COMPANY

Distributers

Electrical Equipment & Construction Materials

330-32 *Azusa St.*
LOS ANGELES

Second & Bryant Sts.
SAN FRANCISCO

2424-28 *First Ave. So.*
SEATTLE

—and suppose you HAD to take the idle brother

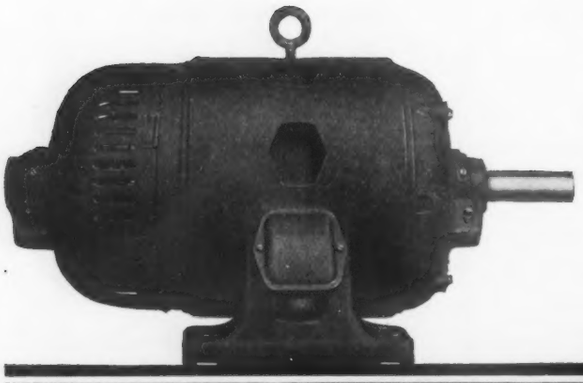
SUPPOSE you were hiring a workman and he said to you: "I can do the work you want me for, all right. But you will have to make room in the shop for my brother.

"He is nearly as big as I am, but he does no work at all. He goes everywhere that I go, and you cannot hire me unless you agree to have him along. He won't ask any wages, but you must provide him with a machine and tools, and give him his lunch at noon, the same as you do for me. He'll take up nearly as much room in the shop as I do, and produce just as much wear and tear on the machinery, but there's no use your expecting any work out of him; you'll just have to make the best of it."

That, until recently, was what the workman, Electricity said to the Central Station company engaged in manufacturing power. There have been two brothers in the Electricity family; Working Current and Idle Current. Working Current has been very valuable; he turns out a great many profitable kilowatts of energy for his employers. But all the time his brother the Idle Current has been loafing in the circuits, using up his share of energy, demanding his full share in the planning of the size of generators, transformers and cables—but doing no work in return.

Adoption of the FYNN-WEICHSEL MOTOR will eliminate the idle brother, and leave room for Working Current to grow up to the full capacity of the system, and increase its earnings in proportion. That is what poor power-factor has meant—costly equipment of no use except for transmitting idle current. There is just one thoroughly satisfactory way to correct power-factor and redeem that equipment—

that is the FYNN-WEICHSEL MOTOR.



Fynn-Weichsel

The motor that corrects power-factor

8420-21

WAGNER ELECTRIC CORPORATION
SAINT LOUIS

WAGNER ELECTRIC CORPORATION
You may send me—without obligation on my part—a copy of your bulletin No. 134, describing THE FYNN-WEICHSEL MOTOR.

NAME
COMPANY
STREET
CITY STATE

"HUBBARD MAKES THE HARDWARE THE HARDWARE MAKES THE LINE"

Setting Standards for Quality

Familiar with every phase of the industry for more than twenty-two years, Hubbard & Company are the leaders in the production of high grade Pole Line Hardware.

The quality of material used in manufacturing and the maintenance of rigid tests for the finished product has made Hubbard Pole Line Hardware the Standard of Quality.

Only new rolled open hearth steel is used and each piece conforms to definite strength requirements.

Select any piece of Hubbard Pole Line Hardware and you will find that its tensile strength is far in excess of the actual requirements.

That is why the great power companies of the West specify Hubbard.

HUBBARD & COMPANY

Pittsburgh, Pa.

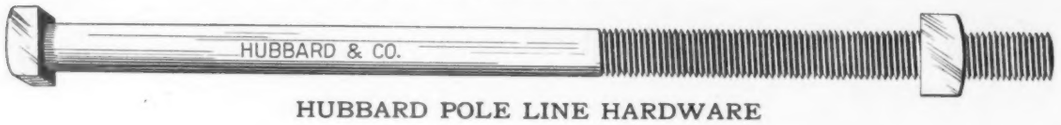
"Check" Seal

PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

Distributors for the Pacific Coast

"Check" Seal



HUBBARD POLE LINE HARDWARE

Anaconda Copper is not Just Copper

ANACONDA
from mine to consumer
TRADE MARK

Anaconda Copper wire is not just copper. It is made from selected Cathode copper reduced in refining furnaces to 99.9% purity. When drawn into wire it tests to an electrical conductivity of 97.5% or better.

From Montana to the Pacific Coast

The rapid industrial advancement of the West is due in large part to the unlimited electrical power at its disposal. Industrial development and city growth has been made possible by the vast supply and low price of electrical power.

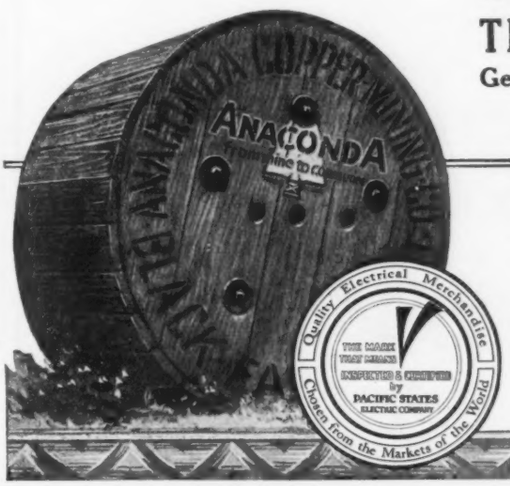
In the transmission of this power, enormous quantities of copper wire have been used, the majority of its coming from the Great Falls, Montana, plant of the Anaconda Copper Mining Company.

The experience of forty years of copper refining has placed Anaconda Copper Wire at the head of the field. The Pacific Coast States, quick to take advantage of the raw supply and finished product at their very doors, are using Anaconda Copper Wire in greater amounts.

Anaconda Copper Mining Company, with an unlimited supply of raw materials, is making Anaconda Copper Wire 99.98% pure, with a conductivity of 97.5% — the choice of the largest power companies in the West.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department **Conway Bldg., Chicago**

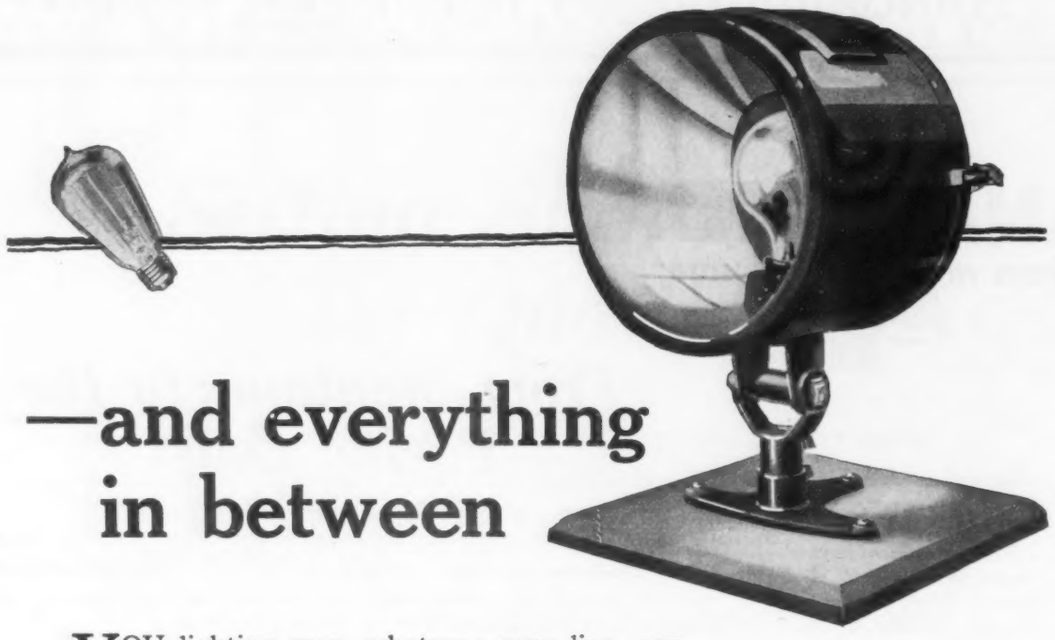
THE AMERICAN BRASS COMPANY
General Offices **25 Broadway, New York**



PACIFIC STATES
ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE

Distributors for the Pacific Coast



—and everything in between

YOU lighting men, whatever your line, can count on Western Electric to back you up with full stocks. How's this for a complete set up?

Show Window and Show Case lighting
Industrial Lighting in all its phases
Store—residence—office lighting
Direct lighting—semi-direct—semi-indirect
—totally indirect
—and Sunbeam Mazda lamps

But Western Electric does more than furnish you the equipment. We place the experience of our lighting specialists at your disposal.

That's our idea of service. If it is yours, too, why not let us get together. Write for details. Address our nearest House or General Sales Department, Western Electric Company, 100 East 42nd Street, New York City.

Western Electric Company

OFFICES IN 47 PRINCIPAL CITIES

One thing less you get with Bermico Fibre Conduit

Handling is one thing which Bermico cannot promise you in abundance. In fact, to each mile you lay there will be exactly 396 fewer lengths of Bermico to handle.

This great saving in labor is made possible by the 8-foot length on which Bermico standardizes. Eight feet instead of the more usual five. No wonder men who use Bermico say, "It is cheapest in the long run"—and the longer your runs the greater the economy.

Bermico Fibre Conduit is durable. It is carefully and accurately made. It is—but naturally we are prejudiced in its favor. Let us send you a sample for your severest testing—so you can satisfy yourself.

Western Electric Company

OFFICES IN 47 PRINCIPAL CITIES

"Jack 'em out" SIMPLEX "Jack 'em out"

With Simplex Jacks
Pole Straightening is a "One Man" Job

Is It On *Your* Lines?

JACKS JACKS

Pole Straightening is a One Man Job with a Simplex Pole Pulling and Pole Straightening Jack

With the multiplied man power in Simplex Jacks one man can straighten the largest pole in less than two minutes.

The jack pivots on its base and follows its load. The I-Beam Base bites into the soil and prevents slipping. The pronged cap of the rack bar is pressed against the pole and holds it securely while the man steps away to sight the pole.

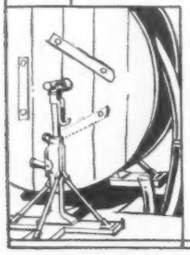
The jack is so powerful it forces the earth back and all it is necessary to do is tamp the loose dirt on the "jack side" of the pole.

The double lever socket enables the man to get a powerful leverage at any working angle of the jack.

Distributed by

Western Electric Company

Offices in 47 Cities

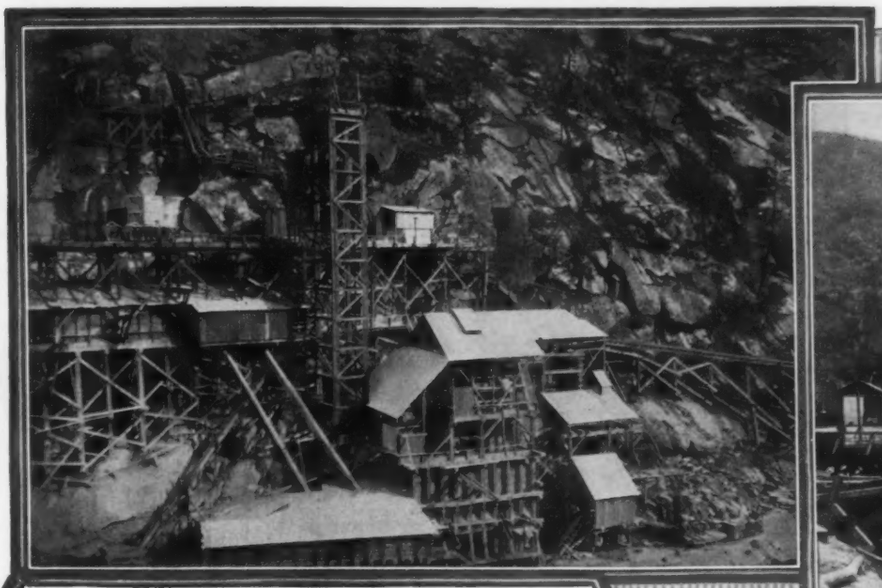


Manufactured by

Templeton, Kenly & Co., Limited

Established 1899 Sole Manufacturers

Chicago Ill. U.S.A.



Rock Crushing Plant at Big Creek Development No. 3.

For Great Engineering Developments

such as the construction of large dams, irrigation projects and other engineering works, Allis-Chalmers Crushing and Cement Making Machinery has demonstrated its reliability and economy in practically all of the projects of any magnitude in the United States as well as in many foreign lands where this equipment has also been extensively used.

The Colon Crushing Plant of the Panama Canal, the Naval Dry Docks at Toulon, France, the Ebro Dam in Spain, the great irrigation projects in Brazil, the Roosevelt Dam, Arrow Rock Dam, Black Warrior River Development of the U. S. Government, are some of the outstanding projects using Allis-Chalmers equipment.

The Southern California Edison Company, whose later developments are illustrated herewith has employed Allis-Chalmers machinery in building the dams for five of its great hydro-electric developments.

These repeat orders over a period of years are evidence of the satisfactory operation of this equipment and of the service given by the Allis-Chalmers organization, whose varied lines of Power, Electrical and Industrial Machinery include nearly the whole field of engineering practice.

No. 9 Style "N" Crusher in Crushing Plant at Big Creek Development No. 3.

ALLIS-CHALMERS

MILWAUKEE. WIS. U. S. A.

Exclusive Features of Design Win Engineers' Approval For Champion Station Equipment

Improvements over conventional practices that have lifted Champion products into immediate favor are especially notable in Champion Switches.

Tongue and hinge clips are of one-piece dropped forged pure copper.

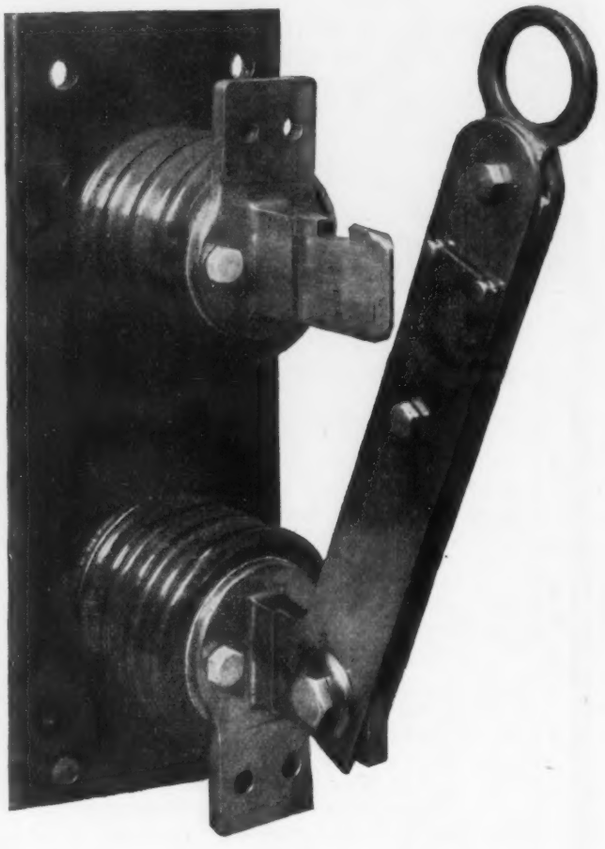
Current carrying parts are of low current density.

A self-adjusting blade contact is also a highly valuable feature.

Thanks to the exclusive use of J-D interchangeable insulators, there is a ruggedness—and consequent dependability—far superior to anything hitherto built.

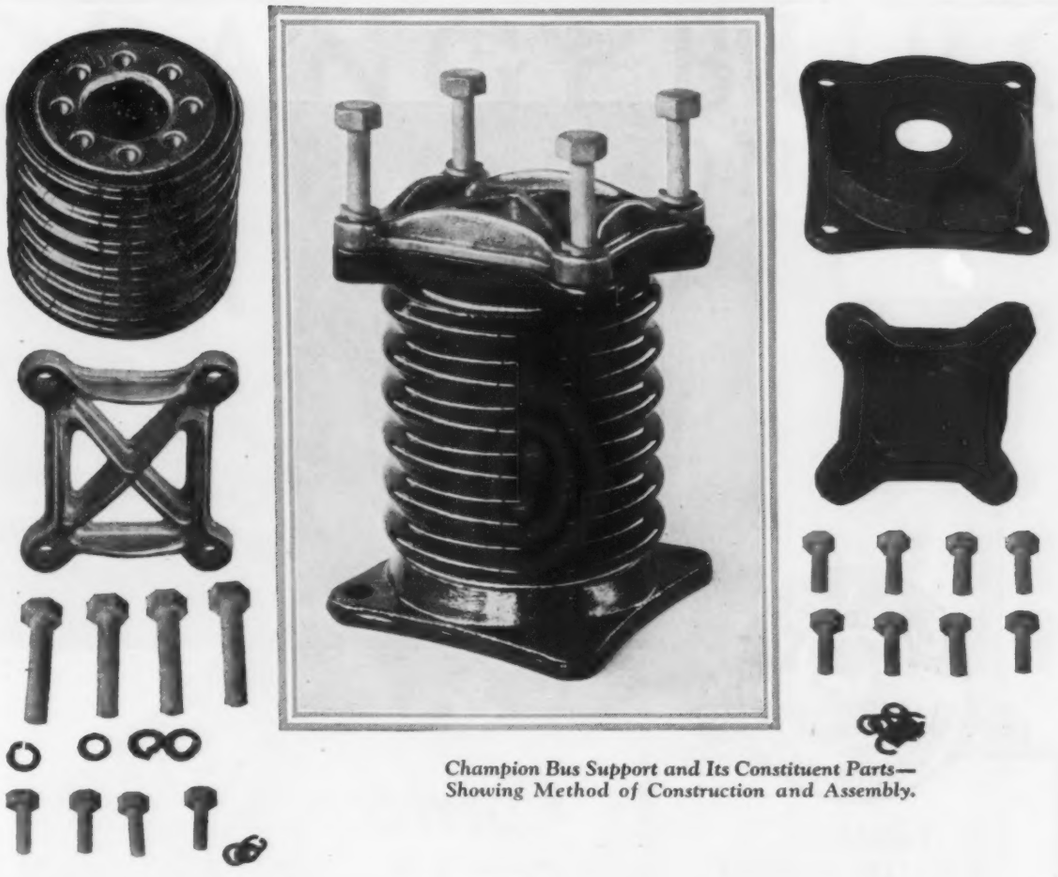
This unequalled ruggedness results logically from the fact that J-D insulators are designed expressly for Champion Switches. They are made to meet the severe requirements involved in equipment of this kind. Likewise the equipment itself is designed to get the most out of the mechanical and electrical values of J-D porcelain.

This expert combination of skillful designing is the main reason why



Champion Switches merit the closest study. Detailed information will be sent you promptly on request and special requirements will be given careful attention by men who thoroughly understand every detail of this highly specialized field.

The CHAMPION



Champion Bus Support and Its Constituent Parts—Showing Method of Construction and Assembly.

Note the method of construction and assembly employed in the manufacture of Champion Bus Supports.

The highest possible degree of reliability and economical maintenance is assured by the following vitally important advantages:

The use of J-D unit type porcelains, jig assembled for perfect alignment. These porcelains are interchangeable for bus supports or switch mounting.

High cantilever strengths, due to Champion's original method of attaching hardware.

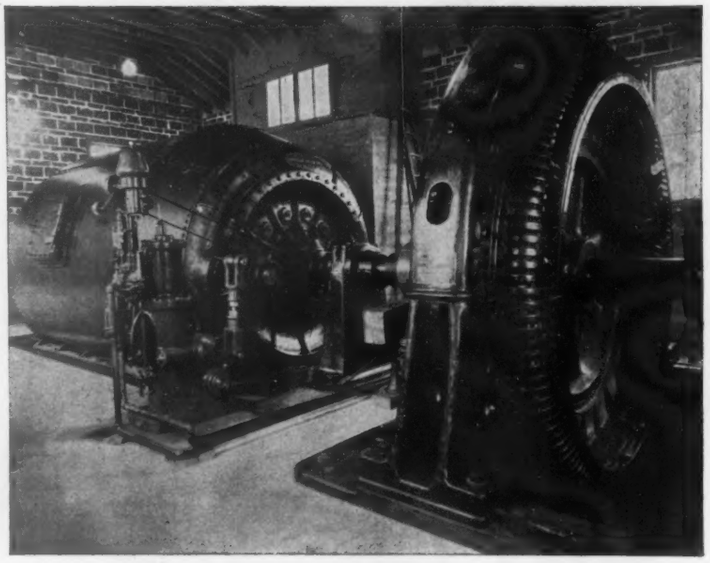
Dropped forged steel bases, assuring true bearing surfaces.

Extremely heavy reinforced clamps; a design that permits adjustments; no cement to crack or crumble under vibration or mechanical impact.

These are points that instantly commend themselves to all engineers. You will keenly appreciate the care and expert knowledge devoted to the design and production of this important factor of station equipment.

SWITCH COMPANY

Works
550 ABBOTT ROAD, BUFFALO, N. Y.
Executive Sales Office
50 CHURCH STREET, NEW YORK CITY



CALOL BRAND
LUBRICATING OILS
STANDARD OIL COMPANY

DEMAND
A CALOL BRAND

For Internal Lubrication of Steam Cylinders

Calol Cylinder Oils
Calol Valve Oil
Calol H. P. Cylinder Oil

For High Speed Service and Exacting Conditions

Calol Engine Oil
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For the Exacting Service of Steam Turbines

Calol Turbine Oil
Calol Turbine Oil Heavy

For Bearing Lubrication of Engines and Shafting under all conditions of Speed, Temperature, Size and Type of Application

Calol Engine Oil
Calol Red Engine Oil
Calol Heavy Red Engine Oil
Calol Heavy Red Journal Oil

Correct Turbine Lubrication

Correct Lubrication of your turbine equipment will reduce your shut-downs, repair accounts and replacements.

The quick separation from water, essential in a hydro or steam turbine lubricant, and resistance to emulsification, are uniformly possessed by CALOL Turbine Oils. They may be filtered and used continuously.

Again and again these lubricants have proven their ability to reduce maintenance costs, and to increase the percentage of turbine operating hours.

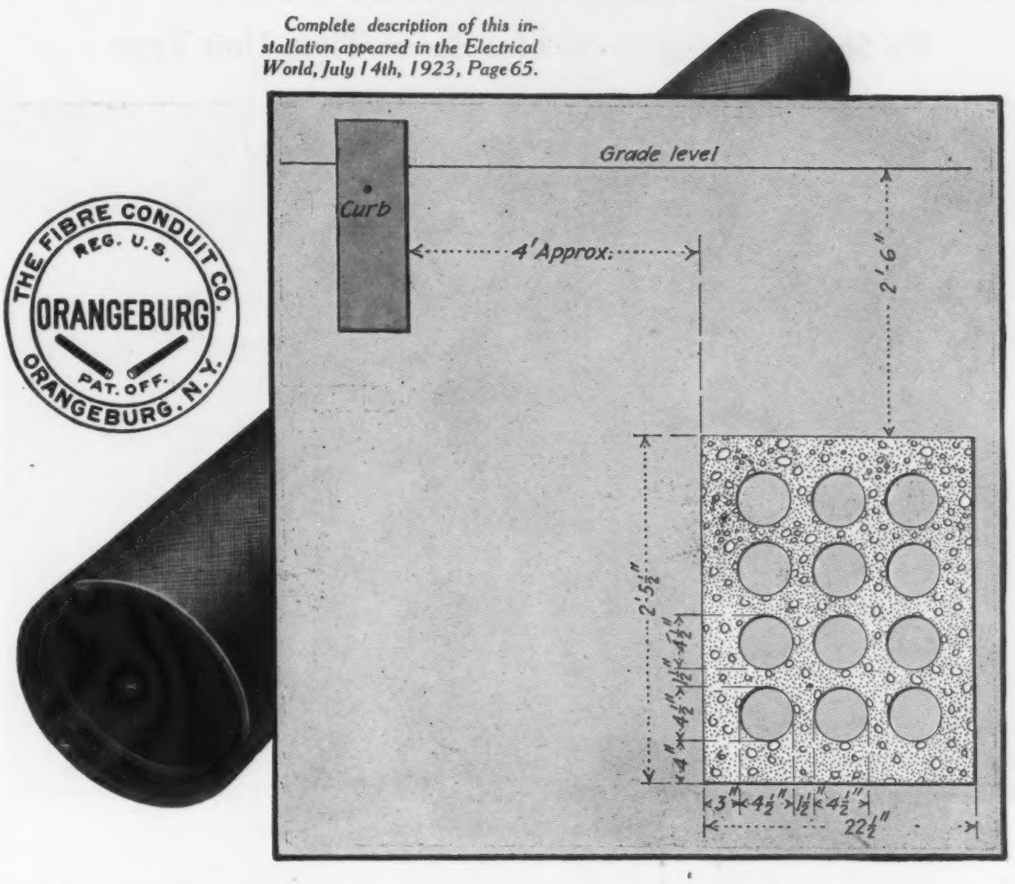
We make prompt deliveries of these lubricants from branch stations near you.

Our Board of Lubrication Engineers has a field member ready to demonstrate Correct Lubrication in your plant.

STANDARD OIL COMPANY
(California)

ORANGEBURG FIBRE CONDUIT

Complete description of this installation appeared in the Electrical World, July 14th, 1923, Page 65.



Safe Transit for 44,000 volts

TO Orangeburg Fibre Conduit is given the responsibility of protecting the first 44,000-Volt underground cables used in this country.

This subway system comprises 23,000 linear feet of underground construction connecting the territory of Westchester County with the source of supply in New York City. A total of 250,000 duct feet of 4" standard socket-joint Orangeburg fibre conduit were used on this job.

The diagram shows the dimensions of the duct system in relation to grade level and curb. Single conductor cables were used.

The success of this system leads us to expect even higher voltages run in Orangeburg systems. You can depend on Orangeburg Fibre Conduit.

JOHNS-MANVILLE Inc.,
294 Madison Ave. at 41st St., N. Y. C.
Branches in 62 Large Cities
For Canada:
Canadian Johns-Manville Co., Ltd., Toronto

Distributors

PACIFIC STATES ELECTRIC CO.

Los Angeles	San Francisco	Spokane
Portland	Oakland	Seattle

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT
Through—
Electrical Materials
FOR
Utilities
Jobber
Contractor
AND
Dealer

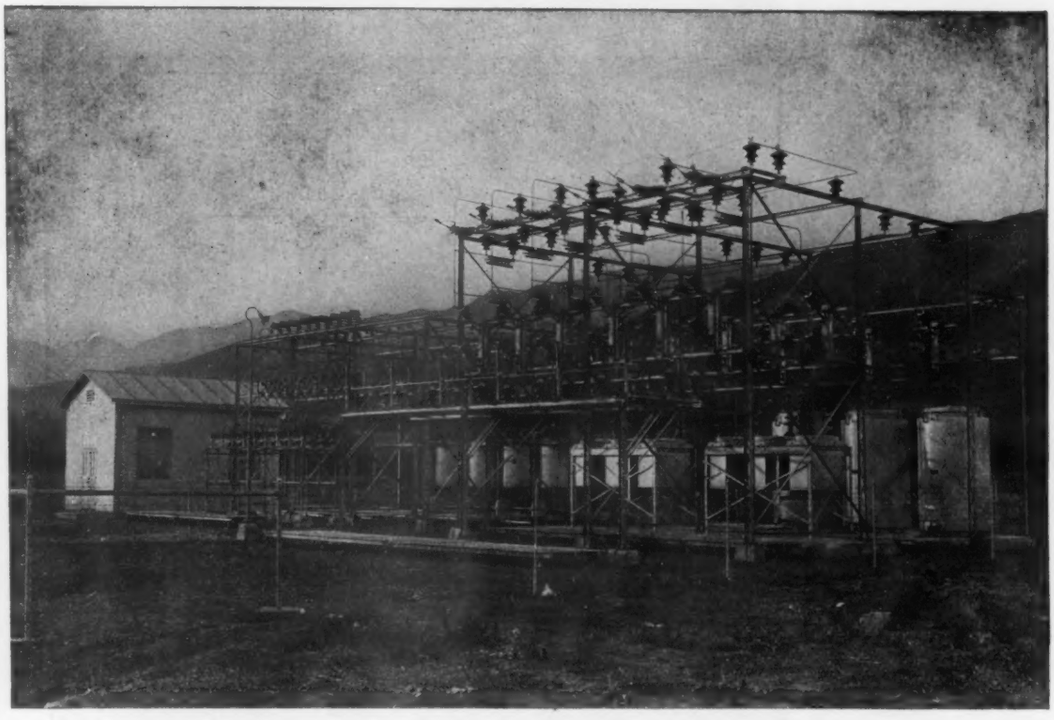
JOHNS-MANVILLE
SOLE SELLING AGENT

HIGH TENSION EQUIPMENT

UNIT TYPE UNIT TYPE UNIT TYPE UNIT TYPE UNIT TYPE UNIT TYPE

NOT ANOTHER ONE

No Sir! Nothing Assembles Easier Than Unit Type



Just Another Good Looking Delta-Star Unit Type Substation.

Would you ignore your best customer?
Never, *Give* him service.

Would you ignore the best manufacturer?
Never, *Get* his service.

Do you really *Know* "Unit Type?"

Let Us Give You the Facts

DELTA-STAR ELECTRIC CO., 2433-61 Fulton Street, Chicago, Illinois

Manufacturers of High-Tension Equipment

LOS ANGELES	SALT LAKE CITY	SAN FRANCISCO	SEATTLE
W. W. Kirk 212 I. W. Hellman Bldg.	L. Brandenburger 419 Dooly Bldg.	W. W. Kirk, Representative F. J. Gleiss, Manager 193 Second Street	W. R. Hendrey Hoge Bldg.

DELTA-STAR

The Standard of Comparison

UNIT TYPE INTERCHANGEABLE PARTS

SEMCO

SEWICKLEY, PENNSYLVANIA

Bulletin 30-J on request

Northwest District Office
EICHER & BRATT
L. C. Smith Bldg., Seattle

DAILY
$8,689.70
The Sum P. G. and E. Paid
FOR TAXES

IT HAS previously been shown that the P G and E **does not make its own rates.**

The **Public** (through the Railroad Commission) fixes the rates, which are made to cover "costs," including **taxes.**

The **tax matter** deeply affects every customer of the Company, because **taxes are a legitimate expense in the cost of doing business and are reflected in the rates for service.**

During the years of 1920, 1921 and 1922, the P G and E paid $9,515,216.00 for taxes, or an average of about $8,689.70 per day, being 20 per cent of its net revenue.

Money saved to the Company in taxes from efficiency in government—City and County, State and National—can be saved to the consumers in rates.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

"PACIFIC SERVICE"

9-224

"DETROIT"
RUBBER COVERED
WIRES

REG. U. S. PAT. OFFICE

"For Every Electrical Purpose"

Rubber Covered Wires and Cables

Automobile Wires and Cables

Telephone Wires

Lamp Cord Antenna Wire

MANUFACTURED BY
DETROIT INSULATED WIRE COMPANY
DETROIT, MICHIGAN

Pacific Coast Stocks Carried By

BAKER-JOSLYN COMPANY

Distributers

Electrical Equipment & Construction Materials

330-32 *Azusa St.*
LOS ANGELES

Second & Bryant Sts.
SAN FRANCISCO

2424-28 *First Ave. So.*
SEATTLE

BURNLEY TRADE MARK

SOLDERING FLUX

Always Best

Paste • Salts • Sticks • Solution

Insist upon your soldering fluxes bearing the Burnley label. This label is your assurance of the best soldering flux that time, money and brains can produce.

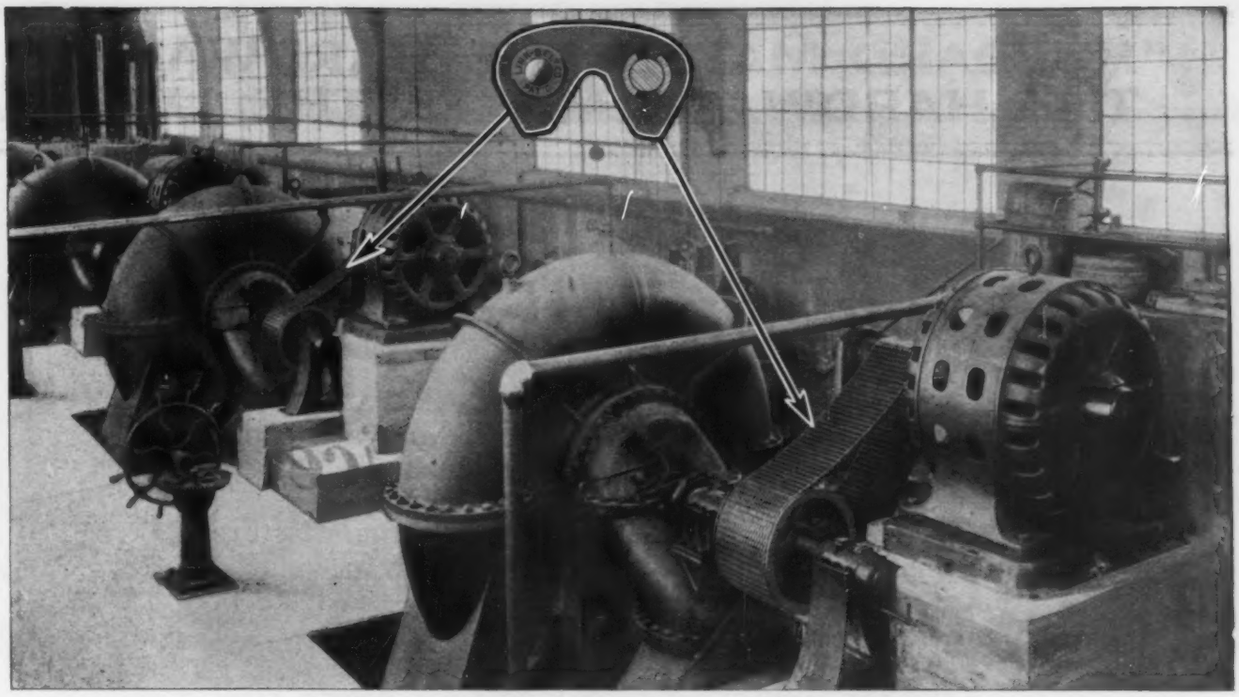
MANUFACTURED BY
THE BURNLEY BATTERY & MANUFACTURING COMPANY
NORTH EAST, PA., U. S. A.

Pacific Coast Stocks Carried by

BAKER-JOSLYN COMPANY

Distributers
Electrical Equipment & Construction Materials

330-32 *Azusa St.* LOS ANGELES
Second & Bryant Sts. SAN FRANCISCO
2424-28 *First Ave. So.* SEATTLE



The Efficient Power Transmitter

HERE is the EFFICIENT drive for line-shafts and machinery of every character —in every line of industry.

It is 98.2% efficient (on actual test). It is flexible as a belt—positive as a gear—more efficient than either. Made in various sizes to transmit power from ¼ H. P. to 1,000 H. P. and over. Thousands of successful installations testify to its unrivaled success.

Link-Belt Silent Chain is practically a flexible gear. It cannot slip. Tension is on the pulling side of the chain only; hence journal friction is much less than with belt drives. No power is lost due to bearing friction; 98.2% of the energy of the motor is transmitted to your shaft or machine to perform useful work. This means increased production.

The drive is not affected by atmospheric conditions, operating equally well in hot, cold or damp places; it permits economy of space because you are able to arrange for centers to suit the convenient location of your driving unit. It combines in one drive the best points of leather belts and cut gears, minus their disadvantages. You should use **Link-Belt Silent Chain** on all important drives in your plant.

Look at the illustration, think over these statements and then send for one of our experienced Power Transmission Engineers to study your conditions. He will explain the results of various tests which have proved the superiority of the Link-Belt Silent Chain Drive. This service we render without obligation.

Link-Belt Silent Chain is the EFFICIENT means of transmitting power, and we welcome the opportunity of proving it to you in your own plant, under your individual conditions. We sell each drive complete and guarantee its successful operation.

Send for 128-page Link-Belt Silent Chain Data Book No. 125. It completely illustrates and describes the drive.

Link-Belt Silent Chain is carried in stock at our Coast Branches. Silent Chain Wheels are now manufactured at our shops in San Francisco and Seattle.

LINK-BELT MEESE & GOTTFRIED COMPANY

San Francisco	19th and Harrison Sts.	Los Angeles	400 E. Third St.
Seattle	820 First Ave. S.	Portland, Ore.	67 Front St.

LINK-BELT

SILENT CHAIN DRIVES

"HUBBARD MAKES THE HARDWARE THE HARDWARE MAKES THE LINE"

Indefinite Service

The ability of Hubbard Pole Line Hardware to give indefinite service is beyond question.

The quality of materials, methods of manufacture and final proofing against severe weather has placed the products of Hubbard & Company at the head of the field.

Only the highest grade of new open hearth steel is used in the manufacture of Hubbard Pole Line Hardware.

Each piece is made to meet rigid standards for tensile strength, which are maintained by daily tests. Hot galvanizing makes them practically proof against destruction by severe weather. Actual tests show they will stand 6 to 8 acid immersions, the equivalent of over 40 years of service.

To obtain indefinite service and immediate satisfaction specify Hubbard.

•

HUBBARD & COMPANY
Pittsburgh, Pa.

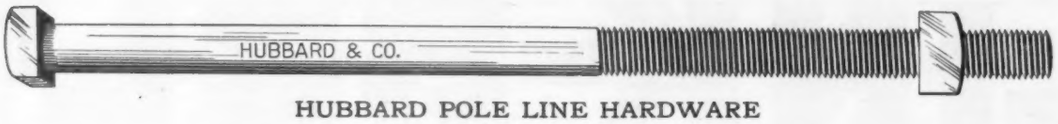
"Check" Seal

PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

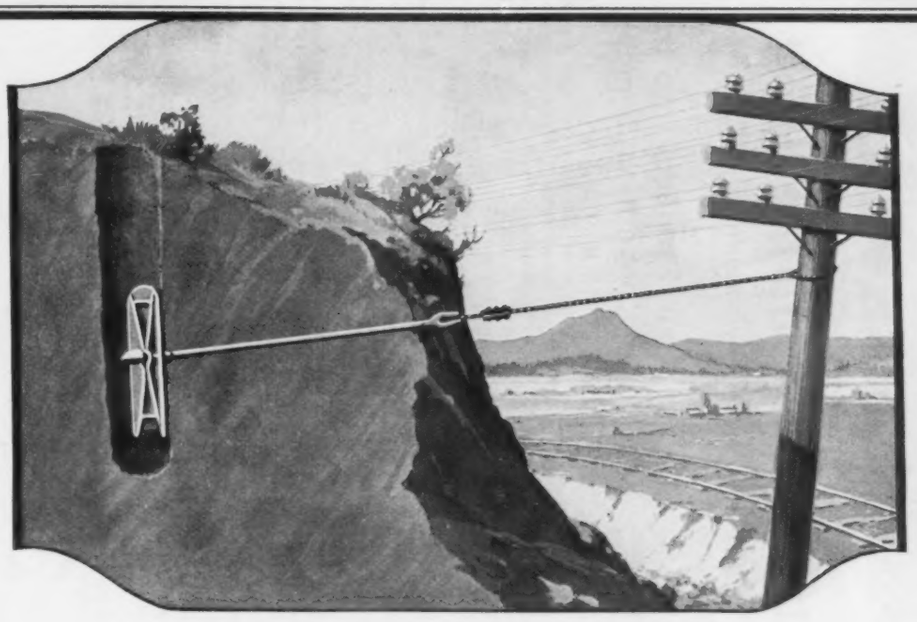
Distributors for the Pacific Coast

"Check" Seal



HUBBARD POLE LINE HARDWARE

"Bolted Through Solid Earth"



Rooted to the Earth --- Not Planted

There is a definite reduction in the cost of "line-maintentenance" when Chance Never-Creep Anchors are used.

These sturdy lifetime anchors root the poles to solid earth with the strength of a growing tree.

Deep pits do not have to be dug to install Never-Creep Anchors—the anchor rod taps to the anchor plate through solid undisturbed earth.

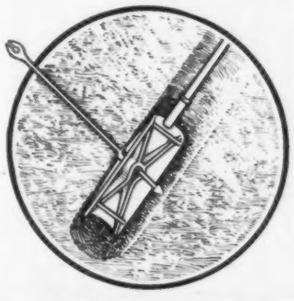
In addition to their greater holding power, Chance Never-Creep Anchors are more economical than wooden "deadmen"—they cannot skid or rot away.

They are made from the finest materials and can be obtained in various sizes to meet all guy-strains.

Manufactured by

CHANCE COMPANY

CENTRALIA, MO.



PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

Exclusive Pacific Coast Sales Agents

These Men—Leaders of the Electrical Industry in the West

Specify, Supply and Purchase Millions of Dollars Worth of Electrical Materials Annually

Journal of Electricity

June 1st Issue

THAT the Pacific Coast Electrical Association Convention "turns to the Journal" illustrates the intimate relation this publication bears to the electrical industry in the West. For the Association annually publishes its convention papers in the June 1 "Journal" and places them in the hands of its entire membership. These men consider the Journal of Electricity the most efficient medium for this purpose.

Page 444 represents any convention paper page. What is true of Page 444, is representative of each and every page of the Pacific Coast Electrical Association Convention issue of the Journal of Electricity. For from front cover to the back cover, each page will have attention value before the convention, during the convention and months afterward as a ready desk reference and buying guide.

"Gentlemen, please turn to page 444 in the June first issue of the Journal of Electricity," tells OUR story. Committee chairmen focus the attention. Will YOUR advertising be in the picture?

Our forms close May 24th.

Reader Interest Reaches Peak

THIS YEAR, these men of the Pacific Coast Electrical Association, who serve in every phase of the electrical industry in the West, will hold their convention June 17 to 21 inclusive at Coronado Island, across the bay from San Diego, California.

In the June first issue, out two weeks before this convention, the Journal of Electricity will publish in full all papers to be later read on the convention floor. Two weeks in which reader interest will be built up. At the convention, the Journal of Electricity will be the official program and handbook to which committee chairmen will refer and in which delegates will follow. Reader interest will reach the peak at San Diego. This situation creates an opportunity for you.

Your advertising in the June first issue of the Journal of Electricity brings your story—that of the manufacturer—right into the convention. Surely nothing could more closely approximate personal interviews with these leaders of the electrical industry on the Pacific Coast.

More than 5,000 copies of the Convention Issue of the Journal of Electricity will go to the men who supply, specify and purchase for the needs of western power companies, jobbers and contractors. These men look to the Journal of Electricity as a reliable source of information. They use the Journal of Electricity as a reference book and buying guide throughout the year.

Catch our reader interest while it is at its highest peak. Place your advertising story before the convention and tap the buying power of the electrical West. Forms close May 24th.

Journal of Electricity
883 Mission Street
San Francisco California

Tie Your Products into the Vital Convention Topics

THE PROGRAM of discussions of the Technical and Commercial Sections of the Pacific Coast Electrical Association Convention gives you a direct advertising lead for your products. For YOUR information we submit in brief a few of the vital topics to be discussed.

Technical Section

Hydraulic Power—hydraulic gates; screens; fish ladders, etc.

Apparatus—transformer cooling; automatic closing switches; relays and relay applications.

Overhead Systems—concrete and steel poles vs. wood poles; line switches; aerial power cable; and overhead distribution.

Underground—conduits and manhole construction; terminals and junction boxes; cable standards for 4,000-volt distribution.

Prime Movers—gas and oil furnace burners; and combination furnaces. Also relative merits of condenser cooling or sea-water and towers.

Meters—maximum demand and KVA. meters; outdoor metering equipment; and standardization of electrical measuring instruments.

Commercial Section

Appliance Bureau—(a) electric ranges and water heaters, (b) sales methods and sales of small appliances, (c) commercial electrical heating with a **discussion on various types of electric heating appliances for the home and commercial buildings.**

Transportation Bureau—operation and maintenance of (a) commercial electric trucks, (b) industrial trucks and batteries.

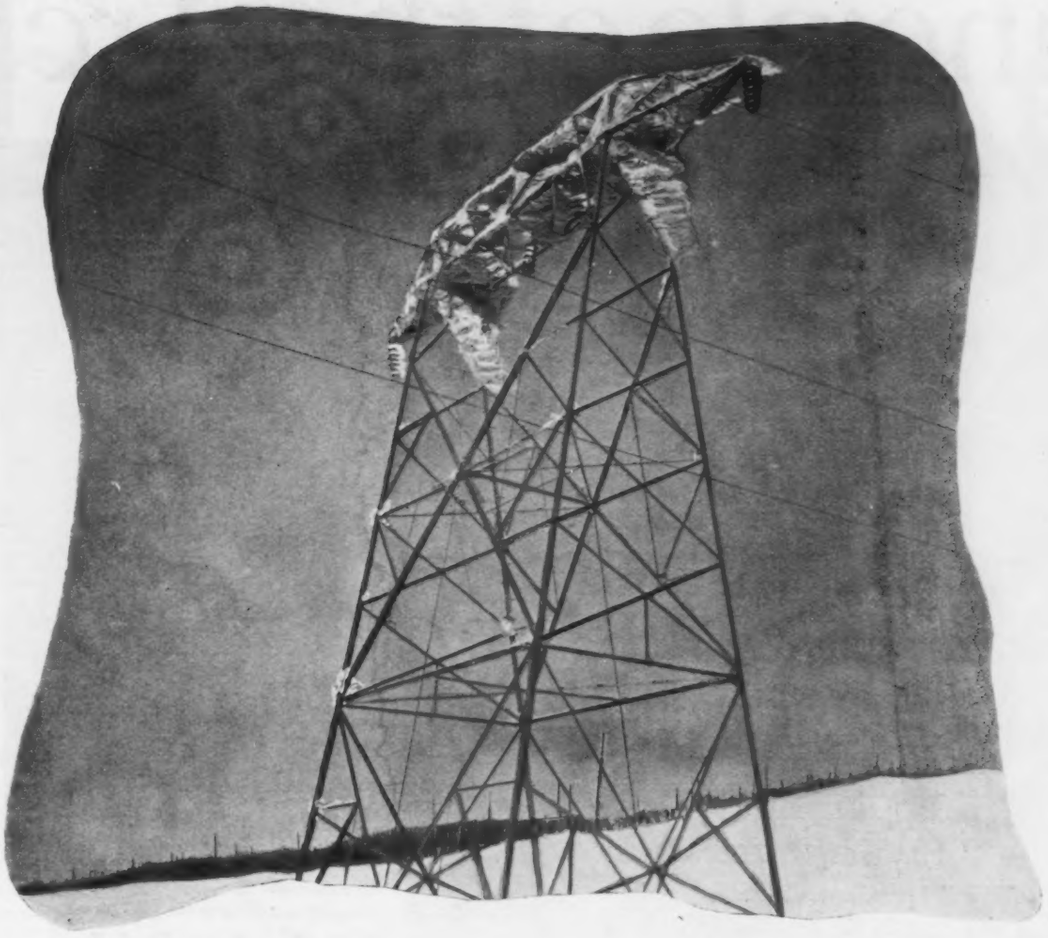
Lighting Bureau—residence lighting, sign lighting and commercial lighting.

Power Bureau—competitive power and industrial electrical heating.

Customers' Service Bureau—report of work done during last year.

Use the June 1 issue **to present the advantages of your particular equipment.** This is your opportunity. Make reservation for advertising space NOW. Give these committeemen the facts on YOUR products. Our forms close May 24th.

Built of
SPECIAL TOWER STEEL



SPECIAL TOWER STEEL
is the tough, ductile High Elastic Limit Steel developed by Pacific Coast Steel Company. It is used for

Transmission Towers
Latticed Poles
Bus Structures
Switch Racks—Platforms
Radio Towers
Electric Sign Supports

THE TOUGHNESS and ductility of Special Tower Steel, combined with its high elastic limit, materially reduce the likelihood of Transmission Tower distortion, even under abnormal conditions of service.

PACIFIC COAST STEEL COMPANY
MANUFACTURERS OF
OPEN HEARTH STEEL
STRUCTURAL SHAPES MERCHANT AND REINFORCING BARS
TRANSMISSION TOWERS AND STRUCTURES
Gen'l Office: Rialto Bldg., San Francisco Plants: San Francisco, Portland, Seattle

"The Structures that Go Together"

Principle of the Arch

This is the famous

Saghir Bridge

of antiquity near Haifa, Palestine, probably the oldest bridge in the world. It is located between Galilee and Jerusalem. Used in later days by Romans and Saracens. The center of a lively dispute as to whether this bridge or a Chinese Arch was the first one on record.

Condex is one of the leaders of the Simplex family. Others include Tirex, Fibrex and Simcore.

The protection afforded Condex is shown below in the illustration of the armored steel covering. Note that there is not one arch but two.

—The basic design back of

Condex Park Cable

Just as this Saghir Arch has served throughout centuries in the old world—the Arch principle successfully applied to Condex Park Cable will serve through generation after generation in the New World. Arch construction is the strongest obtainable. It was chosen especially for Condex Park Cable to correct defects in the older type of park cable. It has two advantages over any other cable now manufactured: (1) It is stronger and will stand any pressure that is liable to be placed upon it without spreading. (2) It gives complete coverage. Bend a piece of Condex and you do not spread the steel armored cover.

CONDEX Park Cable is intended for use on series lighting circuits for municipal street lighting, white way installations and park or playground illuminating systems. It consists of an insulated, lead-covered conductor such as is ordinarily used for series street lighting circuits, protected by an interlocking steel tape, under and over which is a bedding saturated with a preservative compound. It is a distinctly different type of steel taped cable from that which has been used so extensively during the past fifteen or twenty years.

The flexible, locked steel conduit is a steel tape applied spirally around the lead-covered conductor. This steel armor and the unique way in which it is applied form the main distinguishing feature of CONDEX Park Cable. The steel completely covers the cable under all conditions and is securely locked together in such a way that there is little possibility of any portion of the cable ever becoming exposed to mechanical injury. The arch form of the overlapping, interlocking steel gives unusual resistance to crushing.

Conduits are unnecessary; manholes need not be constructed and very little digging is required to obtain a satisfactory installation. It can be laid in a shallow trench in the ground, where it is feasible to dig such a trench, or it can be placed under the pavement on a city street by simply removing one course of paving blocks and placing the cable in the bedding under them.

Condex Park Cable is smaller in diameter and is lighter in weight, size for size, than any other Park Cable. It is easier to handle, there is more cable on a reel, it requires less labor to handle the same amount of cable, it costs less to ship by freight and will last longer than any other Park Cable. These are the facts.

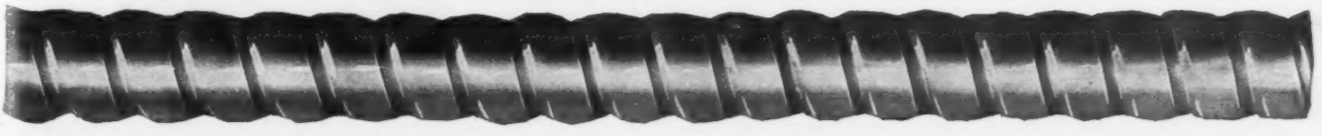
Write for our new descriptive folder. Just off the press.

SIMPLEX WIRE & CABLE Co

MANUFACTURERS

201 DEVONSHIRE ST., BOSTON 9

CHICAGO SAN FRANCISCO NEW YORK



The New Service Entrance Switch

Square D Universal Type

Improved Standardization

The Universal type is the latest development in the Standardized line of entrance switches. Square D Standardized switches are so designed that all meter connections and all fittings are interchangeable with those of the other manufacturers of Standardized material. They permit meter testing without current interruption and with convenience, speed and safety.

The new Square D Universal Type, in addition to all the advantages of the regular standardized line, provides the following features in one unit:

Enclosure of distribution branch cutout block.

Enclosure of branch circuit connections.

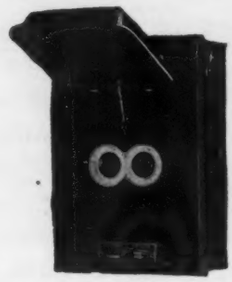
Enclosure of branch circuit fuses.

Easy accessibility of branch fuses.

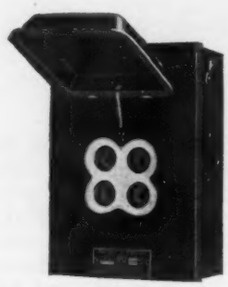
In the design of the Universal type switch consideration has been given to the latest modification in the National Electric Code which permits the omission of the fuse and blade in the neutral wire of the service switch and the necessity under proper grounding condition for fusing only the ungrounded side of the branch circuit.

The Square D Universal type Standardized switch affords economy in time and labor in installation. The main service and the branch circuits are enclosed in one device, eliminating the need for separate installation of each device and the requirements for connecting and wiring them.

The devices provide for different mains service and branch circuit connections, including two or three wire services with two or three wire branch circuits. The devices provide for two branch circuits, single fused or double fused, and for four branch circuits single fused.



The Universal type switch for services requiring two or less branch fuses. The auxiliary cover is open showing the accessibility of the branch fuses.



The Universal type switch for services requiring four branch fuses. The auxiliary cover is open showing the branch fuses.

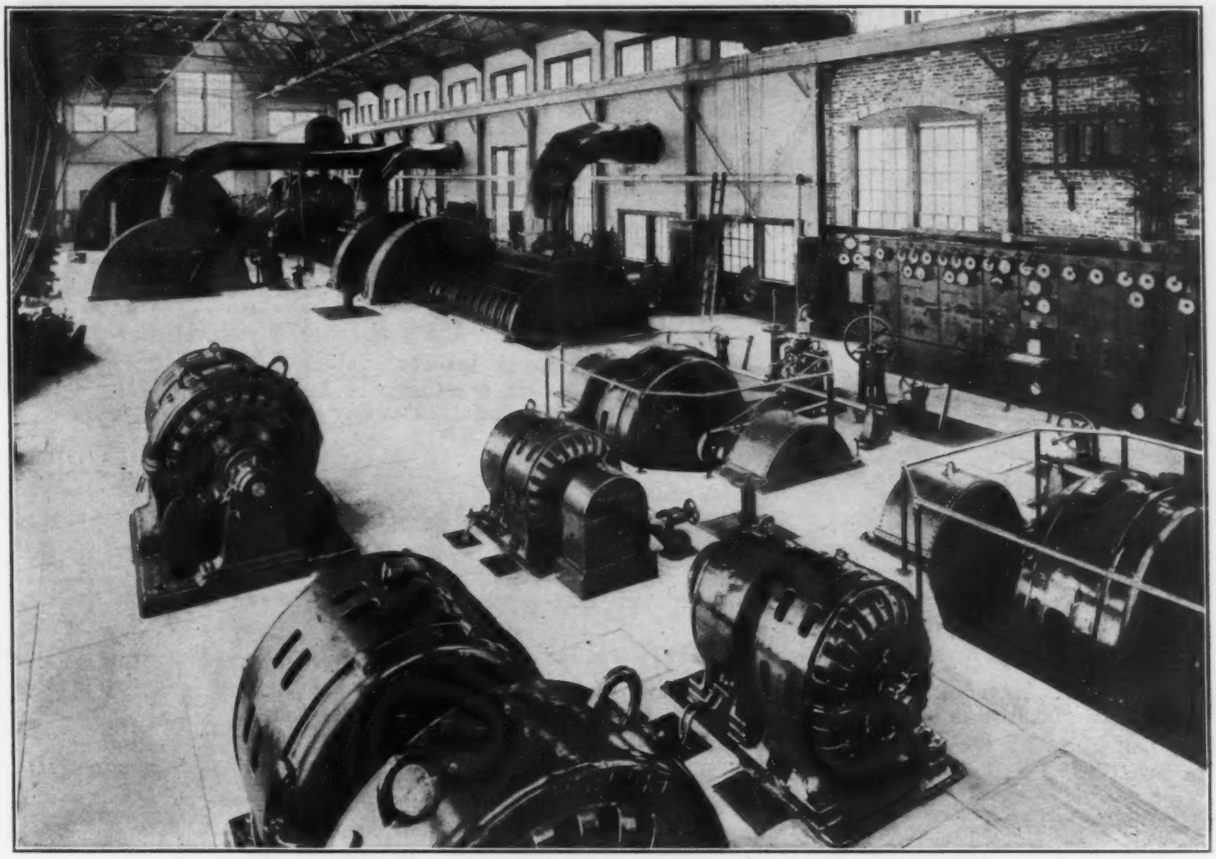
SQUARE D COMPANY, DETROIT, U. S. A.
FACTORIES AT: DETROIT, MICH., PERU, IND., WALKERVILLE, ONT.

Western Branch Office: E. S. Conrad, 236 Rialto Bldg., San Francisco
District Representatives: Los Angeles and Portland

SQUARE D SAFETY SWITCH

PELTON

A Service—Exclusively PELTON



Interior of Granby Consolidated Mining Co., showing a number of PELTON water wheel installations.

Maintenance and Repair Parts Delivered on Short Notice

Some interruptions to the continuity of service given by hydraulic units are inevitable. In other instances, a shut-down is desirable in order to replace parts that are worn as a result of years of continuous operation.

In either case a problem arises which must be solved in the shortest possible time. Herein lies an advantage shared only by The Pelton Water Wheel Co., situated as it is, in the midst of water power development in the west. Complete impulse or reaction units, valves, governors, or any of their parts are designed and manufactured in San Francisco under the most favorable conditions and with facilities that cannot be approached in this section of the country. These advantages are constantly available to western utilities.

THE PELTON WATER WHEEL COMPANY

Hydraulic Engineers

2985 Nineteenth St., San Francisco

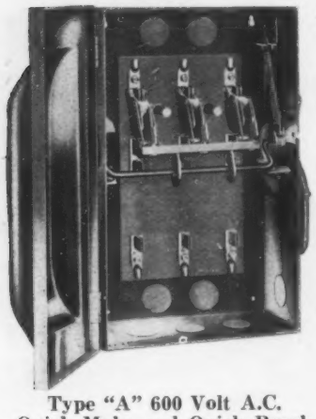
100 Broadway, New York, N. Y.

Associated Companies: Wm. Cramp & Sons Ship & Engine Bldg. Co., Philadelphia; Dominion Engineering Works, Montreal; M. Hilpert & Co., Rio de Janeiro.

Pacific Coast Sales Representatives: Cramp Composition Metals; White Brass Ingots, Manganese Bronze Ingots, High-Pressure Bearing Bronze, Welding Metals.

PELTON

"Circle T" Permissive Interlock Switch Provides Maximum Safety on 440v Service



Type "A" 600 Volt A.C.
Quick Make and Quick Break

1. Permissive Interlock — permits of inspection and tests by authorized persons only, at the same time preventing unauthorized persons from coming in contact with live parts.
2. Snuf-Arc feature allows opening of the switch under load with full safety. Approved by National Board of Underwriters for 600 V.A.C. service.
3. Quick Make and Break insures positive action—switch is either fully opened or fully closed.

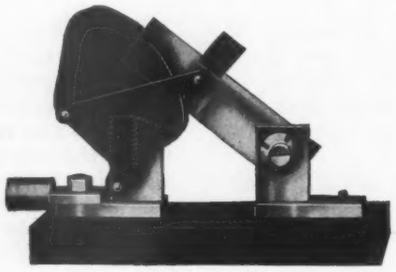
"Circle T" Permissive Interlock Attachment

The Circle T, Class A Safety Switch provides absolute safety on 440 volt installations where same is opened under load. Equipped with Permissive Interlock Attachment and Snuf-Arcs, safety is automatic—no human factor can cause accidents or interruption of service.

This Circle T Type A Safety Switch is of sweated and pinned construction built to withstand over-loads and abuse. All parts are of hard drawn copper, machined to exact size and subjected to rigid inspection on assembly.

The iron boxes have an attractive appearance. A special feature is the interlocking attachment whereby the door cannot be opened while the switch is in contact or the door closed while the switch is opened. The door however can be opened for making inspections and tests without interrupting the service.

Cut illustrates swinging moulded barrier attached to the blade and front contact. Switch blade is enclosed in moving moulded barrier absolutely preventing side flare and the spreading of the arc to adjoining metal parts. Center part of the barrier positively cuts the arc in two as shown in dotted lines.



600 V.A.C. "Snuf-Arc"

The "Snuf-Arc" action is simple, effective and sure as the snuffing action always follows through as the switch is thrown. The heavy center piece, as shown by dotted lines swings closely over the contact jaw post and the two wide flat sections inclose each side of the jaw post and the blade.

The Trumbull Electric Mfg. Company

595 Mission St., San Francisco, Cal.

Factory and General Offices
PLAINVILLE, CONNECTICUT

Branches in New York, Chicago,
Boston, Philadelphia, Atlanta

The Sign of Locke Porcelain

Resistance equals infinity!

Locke Porcelain is the modern transmission line insulation. Thirty years of intensive, specialized development have produced this result.

There are no manufacturing secrets in the making of porcelain. But the utmost care, the finest materials, the skill of experience as well as scientific methods, are required to get a texture that will meet all the requirements of modern high-tension practice.

Until you have investigated the vital differences in the quality of various porcelains you cannot be adequately informed on the subject of high-tension insulation.

Locke Porcelain is of uniform quality. The same grade of porcelain is used for the smallest pin-type insulators and the largest suspension units.

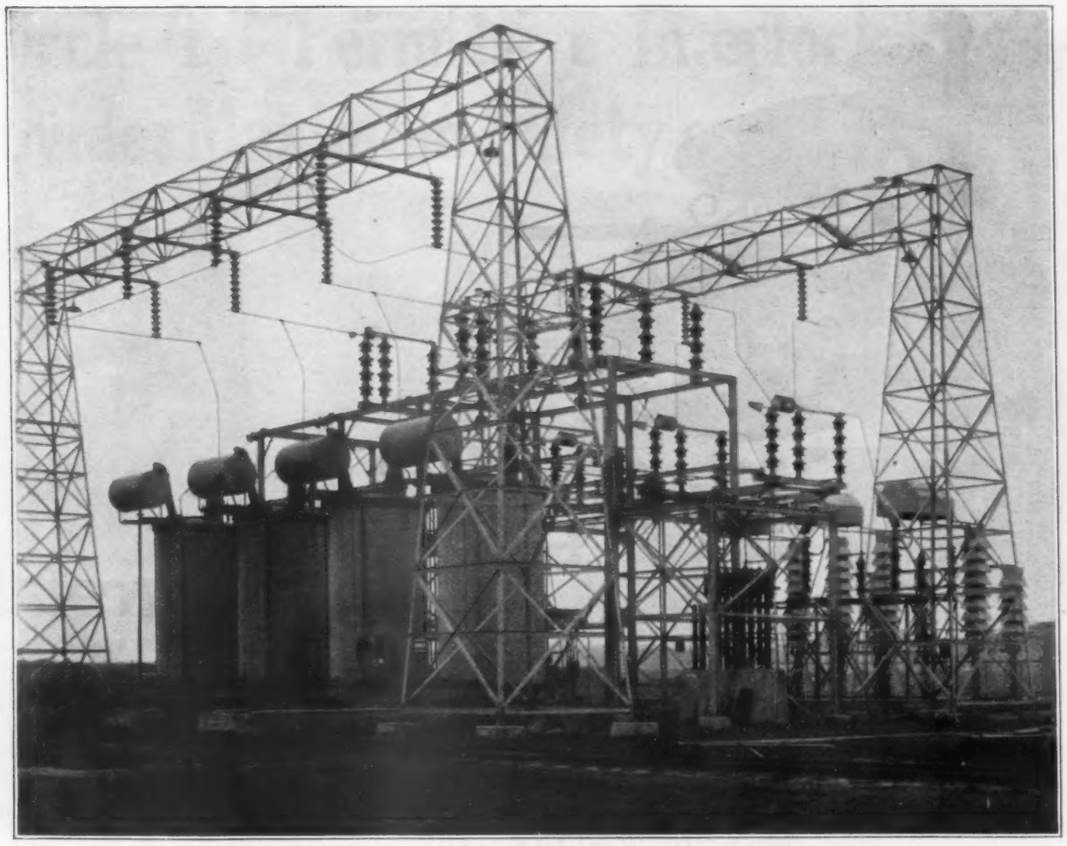
You can depend upon Locke Porcelain which makes possible Locke Insulators.

LOCKE
INSULATOR CORPORATION
Baltimore, Md.
and Victor, N. Y.

PACIFIC STATES
ELECTRIC COMPANY
San Francisco Los Angeles Oakland
Portland Seattle Spokane

Exclusive Pacific Coast Sales Agents

LOCKE
PORCELAIN



Power Transformers

Step-up voltage from Allis-Chalmers equipped turbo-generator plant.

Installation view of four 10,000 K. V. A., 145,000 Y-83,830/12,000 V., water-cooled transformers. Public Service Co. of Northern Illinois, Waukegan, Illinois.

PRODUCTS:

Electrical Machinery
Gas Engines
Steam Engines
Steam Turbines
Condensers
Oil Engines
Hydraulic Turbines
Pumping Engines
Centrifugal Pumps
Mining Machinery
Metallurgical Machinery
Crushing Machinery
Cement Machinery
Flour Mill Machinery
Saw Mill Machinery
Air Compressors
Air Brakes
Steam and Electric Hoists
Farm Tractors
Power Transmission Machinery

ALLIS-CHALMERS MANUFACTURING CO.
MILWAUKEE, WIS. U.S.A.

3rd Year!

This is the 3rd year for June Bride Week and plans for this year are bigger and better than ever. *The power companies are co-operating to the fullest extent* with us as they appreciate the value of June Bride Week to the dealers and themselves.

Here are the campaign features for June Bride Week, June 2nd to 7th this year.

1. Every power bill mailed by every power company will have a June Bride Week leaflet enclosed suggesting electrical appliances as the ideal wedding gift.

2. Attractive three-color posters, 16 x 23 inches, together with orange and black slogan cards are available without charge to all electrical dealers in the State. Write us or ask the nearest power company office for further information.

3. Eleven cash prizes totaling $100 are offered for the best trimmed windows for June Bride Week. Every dealer sending in a photograph which is not listed among the prize winners will be paid $1.50 by the Co-operative Campaign to reimburse him for the expense of having the picture taken.

4. Three inch, one column newspaper cuts similar to the one shown on this page are furnished free to electrical dealers.

5. Publicity in newspaper and magazine columns will broadcast the story of June Bride Week.

Three-color Window Poster 16 x 23 in. on heavy stock.

All material will be furnished free, and remember we are "at your service" for any information that will help you dress up your store for this big week.

California Electrical Co-operative Campaign

314-316 Rialto Bldg.
San Francisco

631 Roberts Bldg.
Los Angeles

PAYNE'S
POLE LINE HARDWARE
HOT GALVANIZED
AND PLAIN
Made on the Coast

Pacific Coast Products for Pacific Coast Users

Standard Items of Pole Line Hardware Carried in Stock

Special Items Can Be Made to Order on Short Notice

Only the Highest Grade Metals Used

Manufactured by

PAYNE'S BOLT WORKS
San Francisco

Complete Stocks of Electrical Transmission and Distribution Equipment and Line Tools

MAYDWELL & HARTZELL, INC.

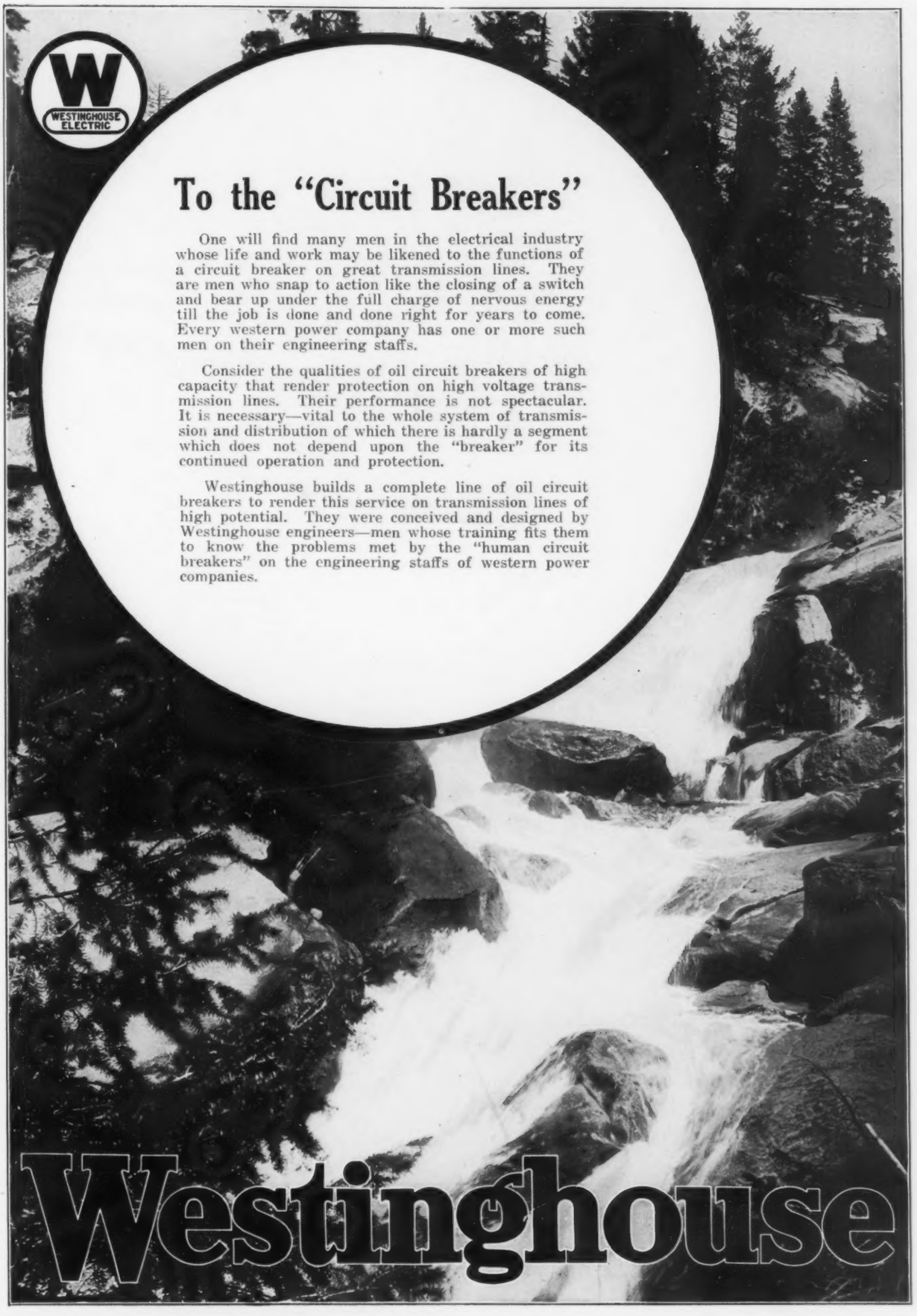
FACTORY DISTRIBUTORS

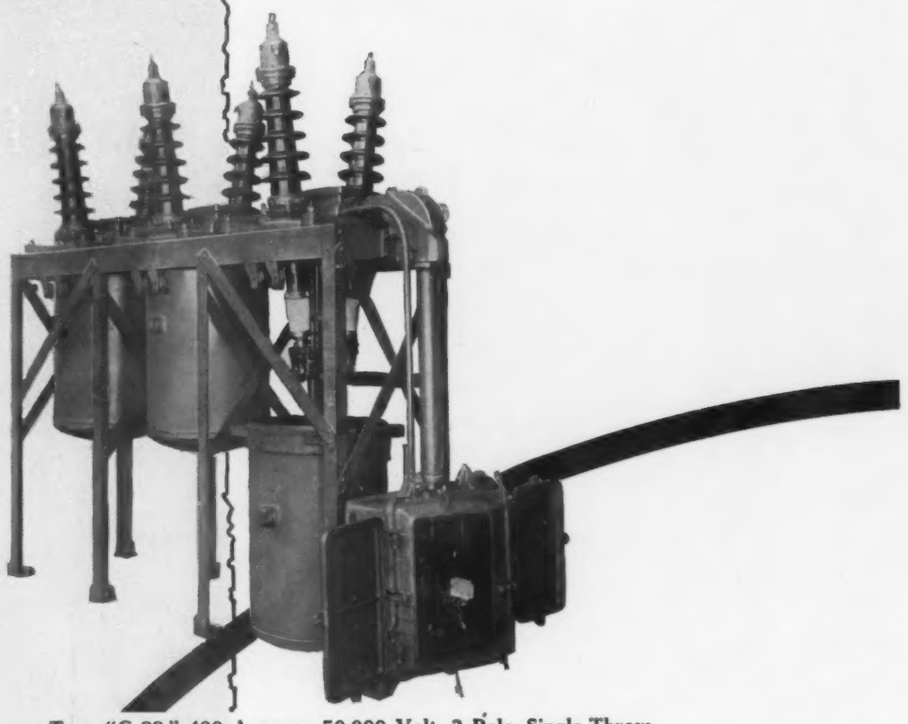
OUR NAME MAYDWELL SPELLS QUALITY

158-168 Eleventh St.
San Francisco

Metropolitan Bldg.
Los Angeles

OUR NAME MAYDWELL SPELLS QUALITY


W
WESTINGHOUSE ELECTRIC
To the "Circuit Breakers"
One will find many men in the electrical industry whose life and work may be likened to the functions of a circuit breaker on great transmission lines. They are men who snap to action like the closing of a switch and bear up under the full charge of nervous energy till the job is done and done right for years to come. Every western power company has one or more such men on their engineering staffs.
Consider the qualities of oil circuit breakers of high capacity that render protection on high voltage transmission lines. Their performance is not spectacular. It is necessary—vital to the whole system of transmission and distribution of which there is hardly a segment which does not depend upon the "breaker" for its continued operation and protection.
Westinghouse builds a complete line of oil circuit breakers to render this service on transmission lines of high potential. They were conceived and designed by Westinghouse engineers—men whose training fits them to know the problems met by the "human circuit breakers" on the engineering staffs of western power companies.
Westinghouse



Type "G-22," 400 Ampere, 50,000 Volt, 3 Pole, Single Throw,
Electrically Operated Oil Circuit Breaker.
Interrupting Capacity at Rated Voltage, 8700 Amperes.

TYPE "G-22" OIL CIRCUIT BREAKERS: A complete line of high capacity, round tank, oil circuit breakers for indoor and outdoor service is available for use on systems where large amounts of power are concentrated. The Type "G-22" oil circuit breakers are made for frame mounting up to, and including, 88,000 volts; for 110,000 volts and above, floor mounting breakers only are furnished; they can be either manually or electrically operated.

W
WESTINGHOUSE ELECTRIC

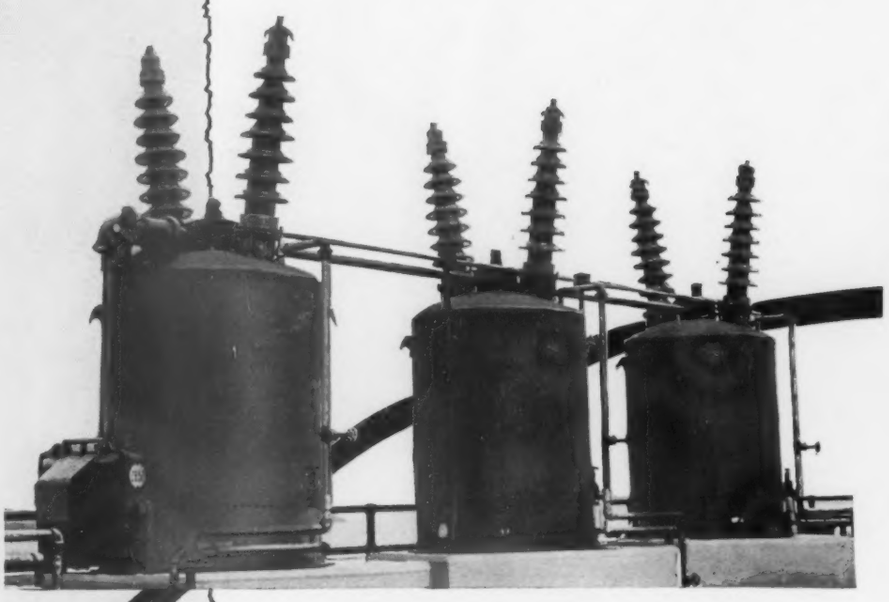
Westinghouse

Type "G-2," 400 Ampere, 73,000 Volt, 3 Pole, Single Throw, Electrically Operated Outdoor Oil Circuit Breaker. Interrupting Capacity at Rated Voltage, 6500 Amperes.

MUFFLERS: When a circuit breaker, equipped with mufflers, opens a heavy short circuit, the air in the top chamber is forced out through the muffler, in advance of the arc gases rising through the oil, thereby preventing the possibility of a violent explosion in the breaker structure due to the mixture of oxygen and arc gases. The rupturing capacity and severity of the duty cycle which a given breaker structure will handle is thereby greatly increased.

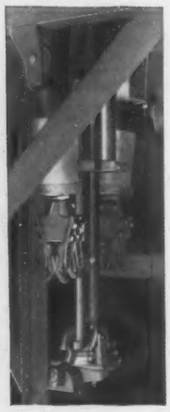
Sectional View of Muffler used with Westinghouse Oil Circuit Breakers.

Westinghouse



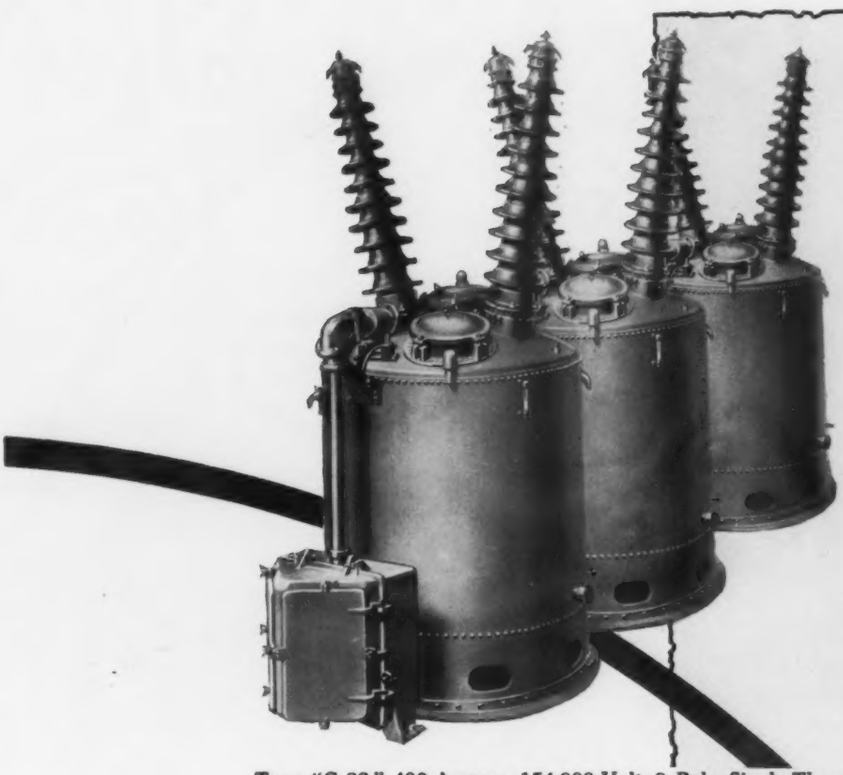
Type "G-2," 400 Ampere, 110,000 Volt, 3 Pole, Single Throw, Electrically Operated Floor Mounting Oil Circuit Breaker. Interrupting Capacity at Rated Voltage, 5300 Amperes.

HIGH SPEED CONTACT SEPARATION: The effectiveness of oil circuit breakers is greatly increased by reducing the duration of the arcing time. Because of the inertia of the moving elements of high tension breakers, it is not possible to accelerate them to the same extent as the moving elements of low tension breakers; to obtain quick rupturing of the arc in high tension breakers, high speed contacts, similar to those in our other G line of breakers, have been developed which give approximately the same speed of contact separation on high tension breakers as secured on low tension breakers.



50 KV Oil Circuit Breaker Contact Details Showing Contacts Completely Open.

Westinghouse



Type "G-22," 400 Ampere, 154,000 Volt, 3 Pole, Single Throw, Electrically Operated Floor Mounting Oil Circuit Breaker. Interrupting Capacity at Rated Voltage, 5500 Amperes.

CONSTRUCTION: The "G-22" Breakers are of sturdy construction with all parts easily accessible, thus making for ease of installation and maintenance. The tanks are all of boiler type construction. The individual pole units are each equipped with a muffler. Effective means are provided to prevent communication of gases from one pole unit to the others or to the mechanism.

W
WESTINGHOUSE ELECTRIC

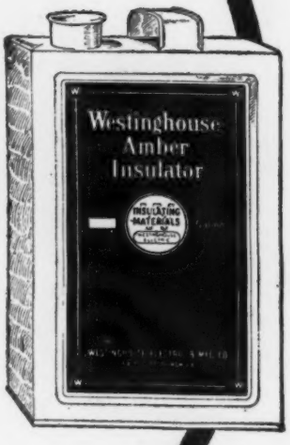
Westinghouse

Insulating Materials

A supply of dependable insulating materials is indispensable to the central station and it is the greatest importance that the quality be of one grade—the best.

Westinghouse research engineers have spent more than thirty years in the development of insulating materials, with constant thought of the part they play in the successful operation of electrical equipment. The products of their study have satisfactorily met the requirement of Westinghouse products just as they will meet the requirements of any apparatus in which the best insulation is essential.

Insulating materials, identical with those used so successfully in Westinghouse products, are available to the industry in handy containers, ready for instant use. And moreover, a Westinghouse engineer is immediately available to help in the solution of any insulating problem that may arise.



Get any needed assistance from our District offices.

List below gives the location of the house nearest you.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pennsylvania

Butte, 52 East Broadway
Denver, 910 Fifteenth St.
El Paso, Mills Building
Fresno, Griffith-McKenzie Bldg.
Los Angeles, 420 S. San Pedro St.
Portland, Porter Bldg.
Salt Lake City, 2nd South and Main Sts.
San Francisco, 1 Montgomery St.
Seattle, 3451 E. Marginal Way
Spokane, 821 Old National Bank Bldg.
Tacoma, 615 Rust Bldg.
Tucson, 90 Church St.

Westinghouse

"Insulator Perfection—Line Protection"

Insulator No. 375
15000 Volts

PINCO
SUSPENSION UNIT

MANUFACTURED BY
PORCELAIN INSULATOR CORPORATION
LIMA, N. Y., U. S. A.

Pacific Coast Distributers

Baker-Joslyn Company

Second & Bryant Sts.
SAN FRANCISCO

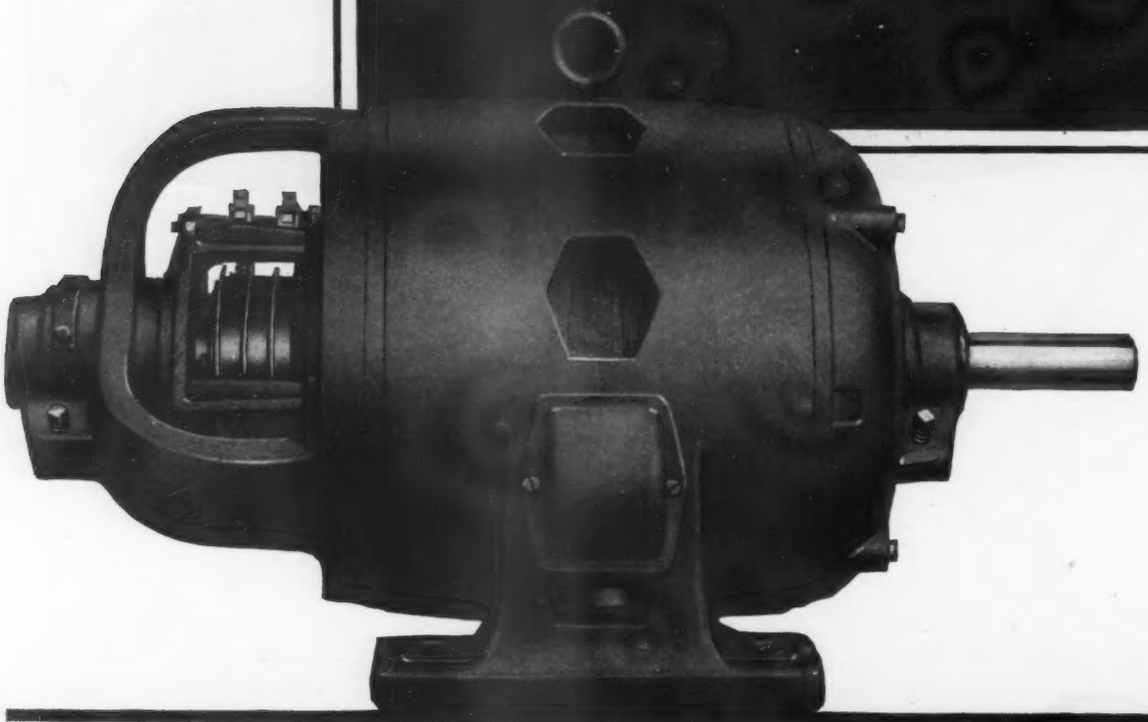
330-332 Azusa St.
LOS ANGELES

2424-28 First Ave. So.
SEATTLE

REL Y ON LOS ANGELES SEATTLE SAN FRANCISCO SERVICE

Distributers
Hot Galvanized Pole Line Hardware
Wood Poles, Cross Arms and Pins
Construction and Linemen's Tools
Porcelain and Glass Insulators
Porcelain Knobs, Tubes and Cleats
Insulated and Bare Copper and Iron Wires
Rigid Iron Conduit and Fittings
Flexible Metallic and Non-metallic Conduit and Armored Conductors
Switches, Switchboards and Fuses
Insulating Materials

10,000 Kw. added without an appropriation



Fynn-Weichsel

The motor that corrects power-factor

A LARGE midwestern power company recently calculated that by raising the power-factor of its system from approximately 0.89 to 0.96 no less than 10,000 kw. of its plant capacity would be released for productive load. It was estimated that in the single item of cables to substations, a saving of $364,000 could be made.

The ratio between kilowatt capacity and total annual kilowatt-hours output of this company is 1 to 840. Therefore, at an average revenue of 1.6 cents per kilowatt-hour conservation of 10,000 kw. of plant capacity would represent a potential increase of $134,400 in income to this company.

These figures concretely and forcefully emphasize the enormous value of the new Wagner FYNN-WEICHSEL MOTOR to Central Stations as a means of eliminating low power-factor.

Installation of these motors in the service of consumers using induction motors would enable the company referred to above to set 10,000 kw. of its plant capacity free to earn this great sum in added income, save the $364,000 otherwise expended for additional cables from powerhouse to substation, save hundreds of thousands of dollars more in copper for distribution from substations to load centers—and accomplish all this without one dollar of investment by the power company.

Installed in service where induction motors are operated, FYNN-WEICHSEL MOTORS provide the Central Station customer with power units of exceptionally advantageous characteristics and at the *same time* raise the power-factor of the entire motor installation.

WAGNER ELECTRIC CORPORATION
SAINT LOUIS

WAGNER ELECTRIC CORPORATION You may send me—without obligation on my part—a copy of your bulletin No. 134, describing THE FYNN-WEICHSEL MOTOR.	NAME
	COMPANY
	STREET
	CITY STATE

8420-11

Anaconda Copper is not Just Copper

ANACONDA
from mine to consumer
TRADE MARK

The Anaconda Arrowhead and the New Age of Copper

In the Copper Age ancient man fashioned the red metal into crude weapons and implements to kill game, till the soil and hew down trees. He put his energy behind the thrust of the spear and the drive of an axe. Life was a day to day struggle for existence.

The world has progressed from the use of brute force' Copper, drawn into wire from bars of purest metal, serves to put a new energy to work. It brings electricity from distant mountains to fertile farms and thriving cities. The Anaconda Arrowhead is a symbol of this new age of copper. It marks a brand of copper wire of highest purity for the transmission of electrical energy today.

Anaconda Copper wire is not just copper. It is made from selected Cathode copper reduced in refining furnaces to 99.9% purity. When drawn into wire it tests to an electrical conductivity of 97.5% or better.

The power companies of the Pacific Coast specify Anaconda for the following reasons: It has high purity and conductivity. Prompt deliveries are assured by adequate plant capacity, unified organization and a strategic geographical location to Pacific Coast points.

ANACONDA COPPER MINING COMPANY
Rolling Mills Department **Conway Bldg., Chicago**

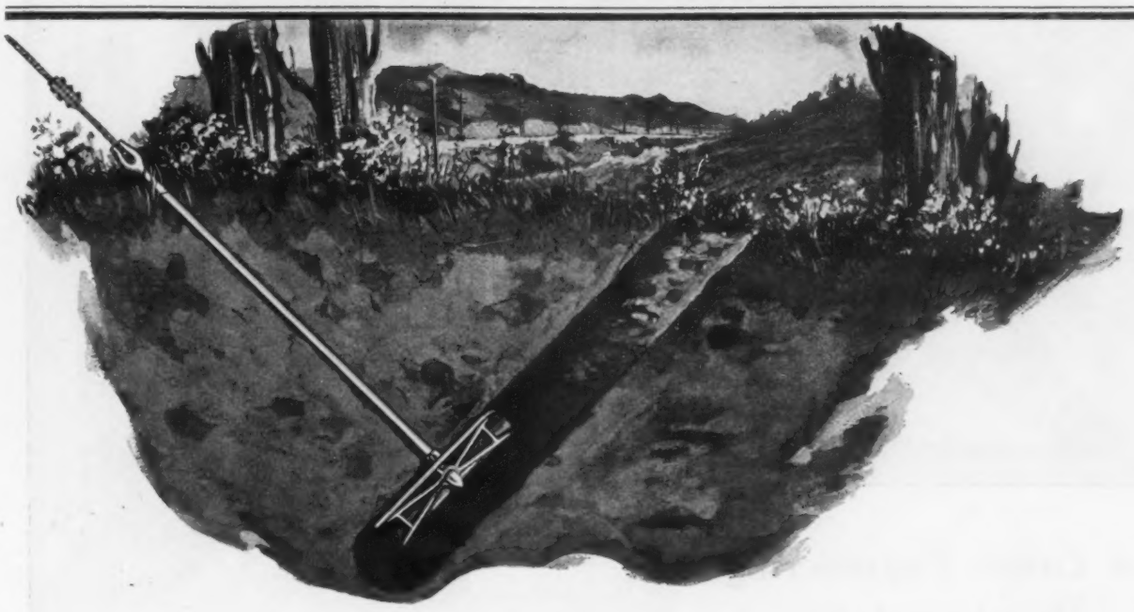
THE AMERICAN BRASS COMPANY
General Offices **25 Broadway, New York**

PACIFIC STATES
ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE

Distributors for the Pacific Coast

"Bolted Through Solid Earth"



Install Never-Creep Anchors for Permanence and Economy

Cut down the cost of pole line maintenance by installing Chance Never-Creep anchors. Replacing wooden dead men that have pulled up, skidded or rotted away is not only costly but unnecessary.

With a Never-Creep anchor, line strains pull against an iron plate inserted in an auger hole drilled at right angles to the direction of strain. There is no pull against disturbed earth. That's why Never-Creep anchoring is the strongest, most lasting and economical method of guying.

The Never-Creep is made in sizes to meet all strain requirements. Each is sold complete with anchor plate and the Never-Creep Thimble-Eye-Rod—an exclusive Chance feature. The Never-Creep, as shipped to you, is ready for immediate installation.

Manufactured by

CHANCE COMPANY

CENTRALIA, MO.

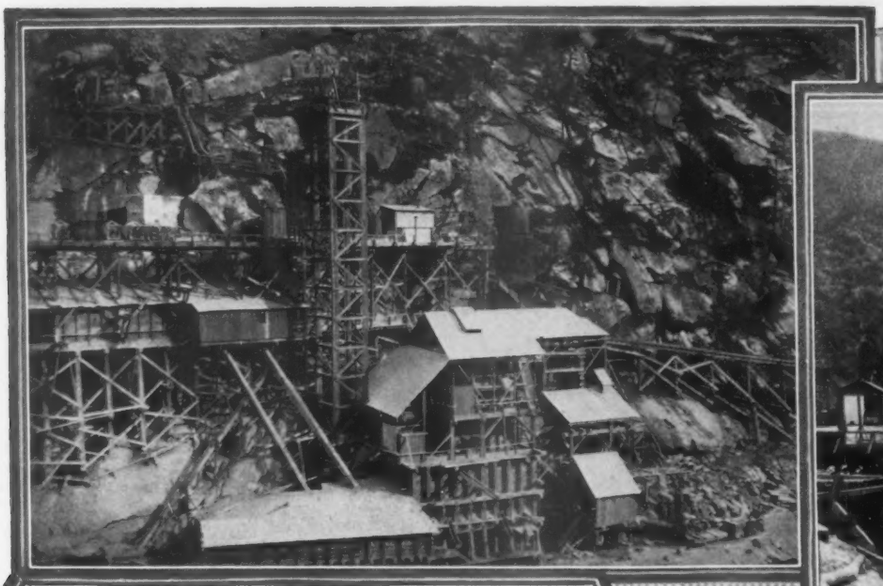
T. M. Reg. 1921

PACIFIC STATES ELECTRIC COMPANY

SAN FRANCISCO LOS ANGELES OAKLAND PORTLAND SEATTLE SPOKANE

T. M. Reg. 1921

Exclusive Pacific Coast Sales Agents



Rock Crushing Plant at Big Creek Development No. 3.

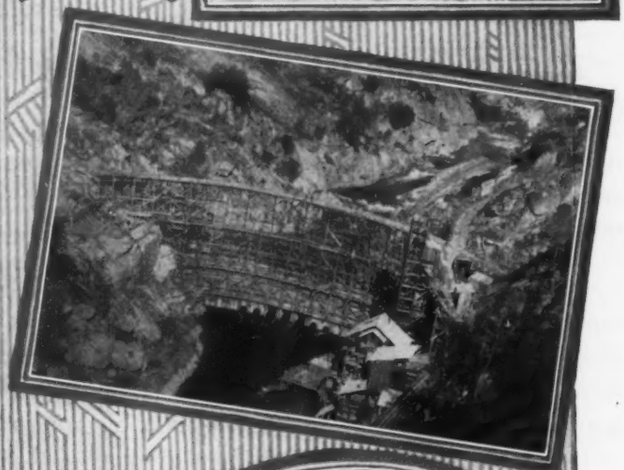
For Great Engineering Developments

such as the construction of large dams, irrigation projects and other engineering works, Allis-Chalmers Crushing and Cement Making Machinery has demonstrated its reliability and economy in practically all of the projects of any magnitude in the United States as well as in many foreign lands where this equipment has also been extensively used.

The Colon Crushing Plant of the Panama Canal, the Naval Dry Docks at Toulon, France, the Ebro Dam in Spain, the great irrigation projects in Brazil, the Roosevelt Dam, Arrow Rock Dam, Black Warrior River Development of the U. S. Government, are some of the outstanding projects using Allis-Chalmers equipment.

The Southern California Edison Company, whose later developments are illustrated herewith has employed Allis-Chalmers machinery in building the dams for five of its great hydro-electric developments.

These repeat orders over a period of years are evidence of the satisfactory operation of this equipment and of the service given by the Allis-Chalmers organizaiton, whose varied lines of Power, Electrical and Industrial Machinery include nearly the whole field of engineering practice.



No. 9 Style "N" Crusher in Crushing Plant at Big Creek Development No. 3.

ALLIS-CHALMERS

MILWAUKEE. WIS. U. S. A.

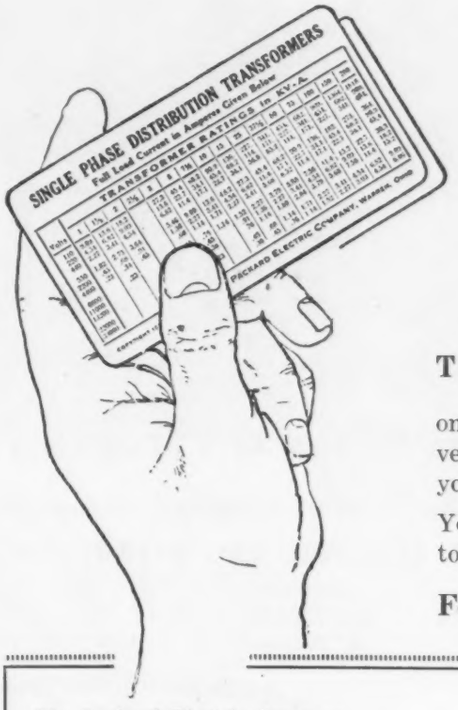
A Square Deal for Transformers

means for one thing that they are correctly fused. Fuses are cheaper than transformers.

The evidence accumulated in over a third of a century's experience in the manufacture of transformers is to our mind quite conclusive.

"Abuse and Neglect are the causes of most transformer failures." Packard transformers, as good as we make them, will render still better service if given a square deal.

In the interests of a square deal for all transformers we have had tabulated the full load current values of the complete range of distribution transformers.


SINGLE PHASE DISTRIBUTION TRANSFORMERS
Full Load Current in Amperes Given Below
TRANSFORMER RATINGS IN K.V.A.
PACKARD ELECTRIC COMPANY, WARREN, OHIO

This Tabulation

on a celluloid card of convenient pocket size is gladly yours for the asking.

Your request will bring it to you by return mail.

For Your Convenience

The Packard Electric Company
Warren, Ohio

Transformer Manufacturers since 1890

H. B. Squires Co.
583 Howard Street
San Francisco

Burton R. Stare
619 Fourth Ave.
Seattle

L. J. Smith
451 E. Third St.
Los Angeles

Stock carried in San Francisco

The Packard Electric Company,
Warren, Ohio

Below is my address—please send me gratis the celluloid tabulation card shown in the Journal of Electricity.

Mr.....

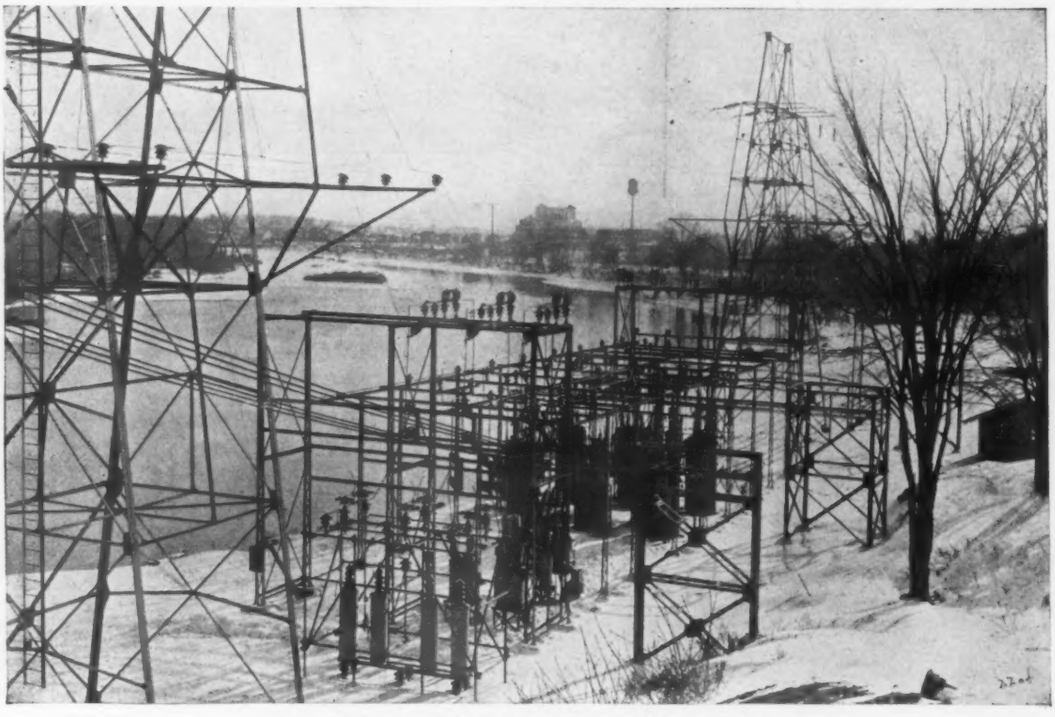
Address.....

Company.....

HIGH TENSION EQUIPMENT

UNIT TYPE

Somebody Had to Do It.
Everybody Knew It Was Coming
Unit Type Substations



A Typical DELTA-STAR 44,000 Volt Outdoor Substation
(Every Insulator and Fitting Is Interchangeable—Real Standards)

Delta-Star was Farsighted—That's All

Just a Little Better — Just Ahead in Design — Unit Type Outdoor Substations.

DELTA-STAR ELECTRIC CO., 2433-61 Fulton Street, Chicago, Illinois

Manufacturers of High-Tension Equipment

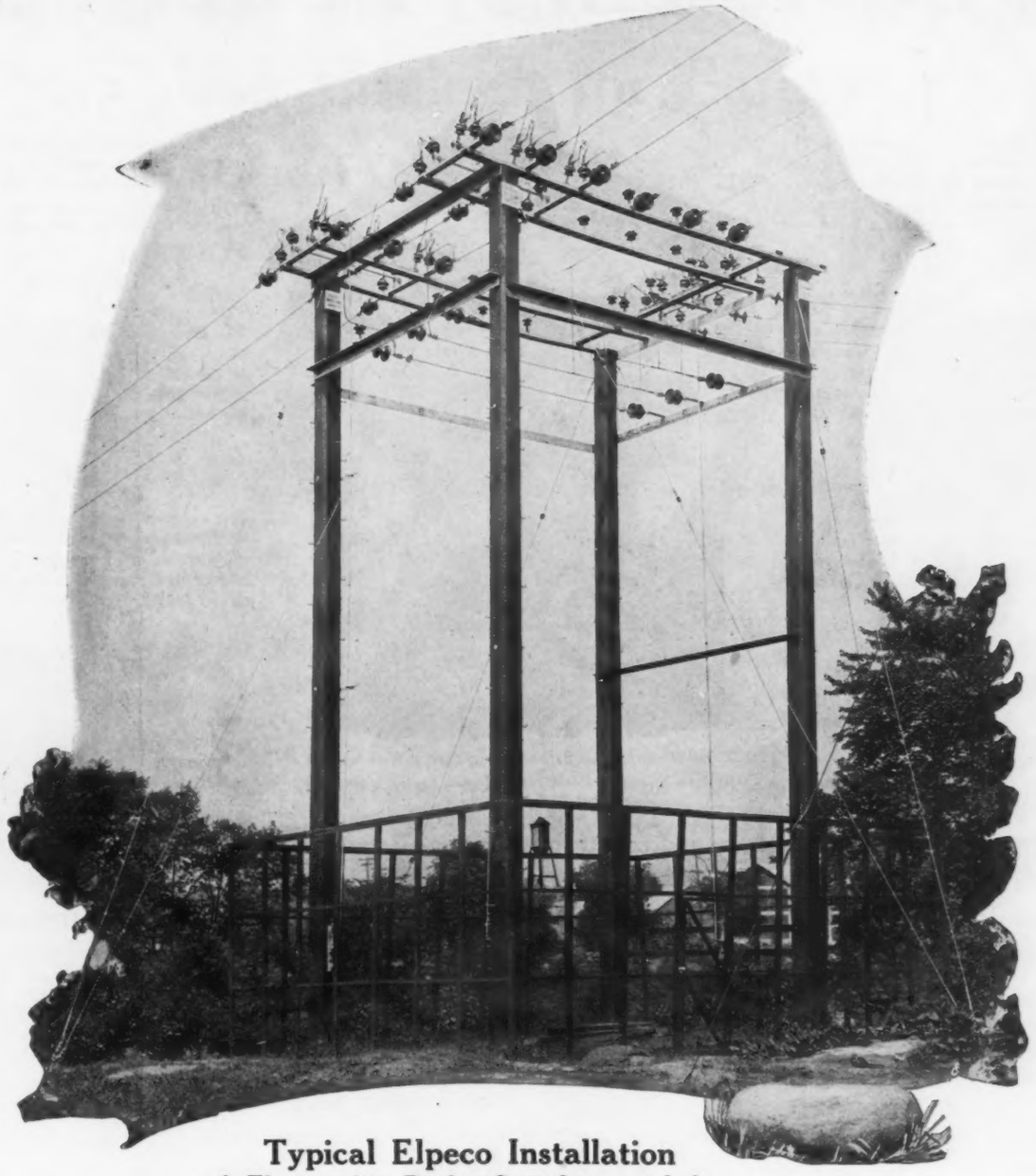
LOS ANGELES	SALT LAKE CITY	SAN FRANCISCO	SEATTLE
W. W. Kirk	L. Brandenburger	W. W. Kirk, Representative	W. R. Hendrey
212 I. W. Hellman Bldg.	419 Dooly Bldg.	F. J. Gleiss, Manager	Hoge Bldg.
		193 Second Street	

DELTA-STAR

The Standard of Comparison

UNIT TYPE INTERCHANGEABLE PARTS

Handling the Industrial Load



Typical Elpeco Installation
of Elpeco Air Brake Switches used for sectionalizing two relay lines supplying a large textile center. *Let us tell you their advantages.*

ELPECO
ELECTRIC POWER EQUIPMENT CORPORATION
New Address
412-20 No. 18th St. PHILADELPHIA
Western Representatives: C. E. INGALLS, Rialto Bldg., San Francisco, Cal.; EICHER & BRATT, 2107 L. C. Smith Bldg., Seattle, Wash.

8 Sangamo Features

1

The light-load adjustment is of the micrometer type, so delicate and precise that you can adjust to one-tenth of one per cent at one-tenth load, with a positive setting.

2

Upper and lower shaft pivots are protected from shock, vibration or corrosion, one by a brass sleeve, the other by a brass cup permanently swaged on the shaft.

3

The recording train is accurately and firmly held in place by the two locking levers. Press them down, and it can be quickly and easily removed.

4

The supporting bracket of the worm-wheel shaft is slotted and fits accurately over the sleeve of the upper bearing, assuring accurate meshing with the worm.

Type H meter for alternating-current service. Fully described in Bulletin 55, sent free on request.

5

Full-load adjustment is accomplished by the soft iron disk, moved by a micrometer screw, which varies the magnetic flux without disturbing the permanent magnets.

6

The main grid being cast in one piece, and held in exact relation to the base, gives positive alignment to bearings, and rigidity to the whole structure of the meter.

7

The connection box covers can be furnished either completely removable, or permanently attached and hinged, as the purchaser may prefer.

8

The entire moving system can be easily and quickly removed for examination or repairs without unfastening the grid or disturbing any adjustments.

EVERY point in the design and construction of SANGAMO METERS has been carefully worked out with a view to these considerations:

1. Sustained accuracy
2. Reliability and sturdiness
3. Low cost of maintenance

Accuracy results from scientific design, mechanically perfect construction and thorough inspection; all of which we thoroughly understand and are accustomed to supply. Reliability and sturdiness—ability to stand up under even rough usage with no loss of accuracy or efficiency—result from accurate, strong and rigid construction, precise and positive adjustments, and a design in which all weak spots have been eliminated by experience. Low cost of maintenance results from a design which makes every part of the meter instantly and easily accessible for inspection and repair, combined with construction that makes neither frequently necessary.

SANGAMO

Sangamo Electric Company, Springfield, Illinois

NEW YORK CHICAGO BIRMINGHAM SAN FRANCISCO LOS ANGELES

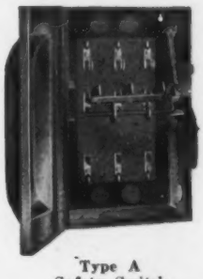
METERS FOR EVERY ELECTRICAL NEED

SANGAMO METERS

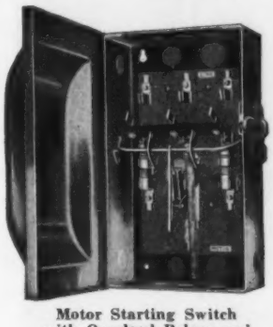
4120-2

Throughout the Year---On Every Job Use Circle-T for Safety

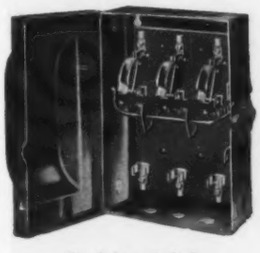
Standardization on Trumbull Switches for 1924 will enable you to provide safe, dependable control for every type of light, heat, or power load.



Type A
Safety Switch
Quick-Make and Quick-Break



Motor Starting Switch
with Overload Relays and
U.V.R. Coils



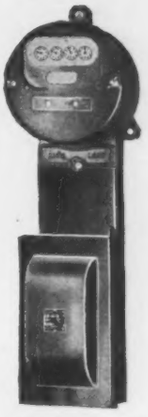
Snuf-Arc Switch
Quick-Make and Quick-Break

At the start of this new year of continued building activity the completeness of the entire line of Trumbull switching equipment is better adapted than ever before to meet every need of residential, commercial, and industrial construction.

For homes, stores, garages, small shops the Trumbull Type C Externally Operated Switch provides adequate safety and protection; heavier commercial and industrial installations require our quick-make and quick-break Type A Safety Switch; for 440 V.A.C. lines and higher voltages the Trumbull Snuf-Arc Switch is strongly recommended; fool-proof protection to heavy inductive loads is provided by our new Motor Starting Switch with Overload Relays and U.V.R. Coils; and Trumbull Entrance Switches are available with or without meter trims.

Safety Switch Bulletin No. 5 is arranged for your easy and convenient use with all the details of the entire Circle-T Line. Ask your jobber for a copy.

Type C
Externally
Operated Switch



Entrance Switch
with meter trim

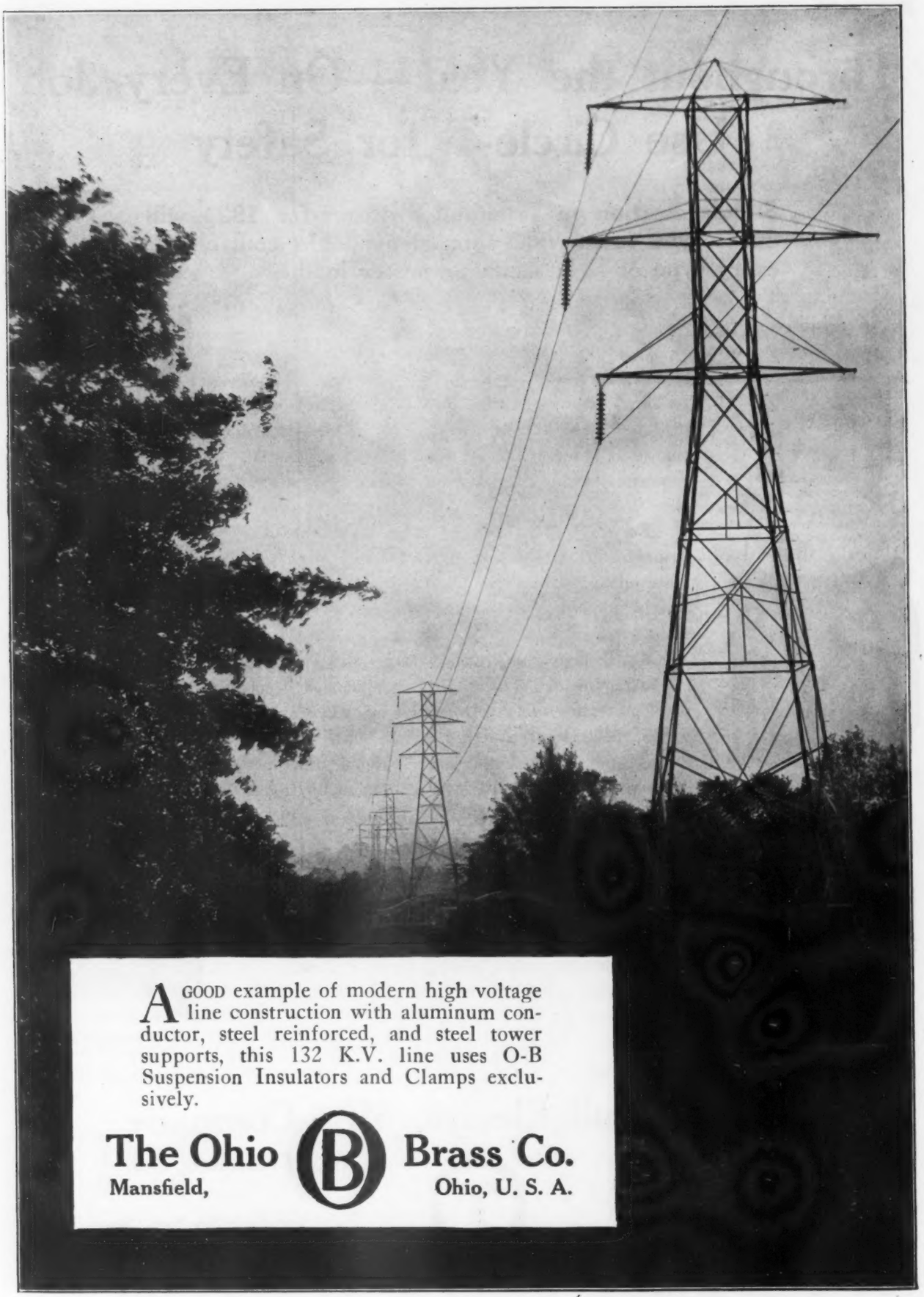
Motor-Starting Switch
with protective plugs

The Trumbull Electric Mfg. Company

595 Mission St. **San Francisco, Cal.**

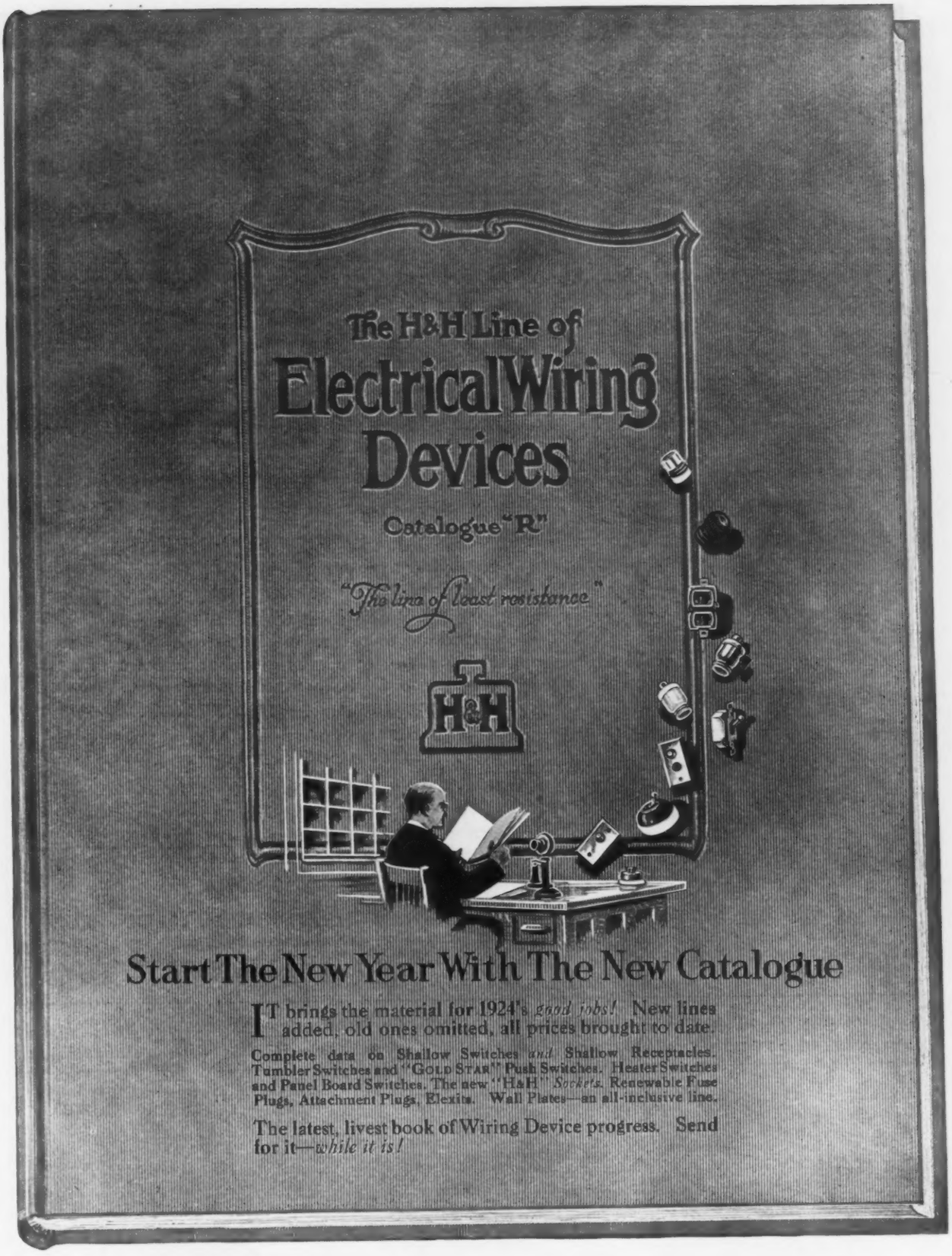
Factory and General Offices
PLAINVILLE, CONNECTICUT

Branches in New York, Chicago, Boston, Philadelphia, Atlanta



A GOOD example of modern high voltage line construction with aluminum conductor, steel reinforced, and steel tower supports, this 132 K.V. line uses O-B Suspension Insulators and Clamps exclusively.

The Ohio Brass Co.
Mansfield, Ohio, U. S. A.



Start The New Year With The New Catalogue

IT brings the material for 1924's *good jobs!* New lines added, old ones omitted, all prices brought to date.

Complete data on Shallow Switches *and* Shallow Receptacles. Tumbler Switches and "GOLD STAR" Push Switches. Heater Switches and Panel Board Switches. The new "H&H" *Sockets.* Renewable Fuse Plugs. Attachment Plugs. Elexits. Wall Plates—an all-inclusive line.

The latest, livest book of Wiring Device progress. Send for it—*while it is!*

THE HART & HEGEMAN MFG. CO. HARTFORD, CONN.

Localet
Cat. No. 77

Locatap
Cat. No. 1080

Duolet
Cat. No. 122

Two-Way Plug
Cat. No. 92

Pull Plug
Cat. No. 292

Portable Lamp Factories Rushed with Orders

PORTABLE-LAMP manufacturers appear to be turning out their product in a sort of whirlwind finish of the year's work, the demand in representative sales offices exceeding that of last year by 50 per cent or more and mounting up to a record surpassing all previous experience. . . . . Enough business is now on the books of one leading manufacturer of portables to keep the plant running full time for the next six months—

Electrical World, Dec. 1.

There will be a big market for two-way plugs in 1924

Not only to connect up portables, but flat-irons, toasters, cleaners, washers and many other appliances.

Millions of socket-connected appliances added to homes all over the country mean a market for millions of two-way plugs to make them immediately useful.

Stock the Benjamin Line—a two-way plug for every purpose. Make your place headquarters for two-way plugs.

Push Benjamin two-way plugs in 1924.

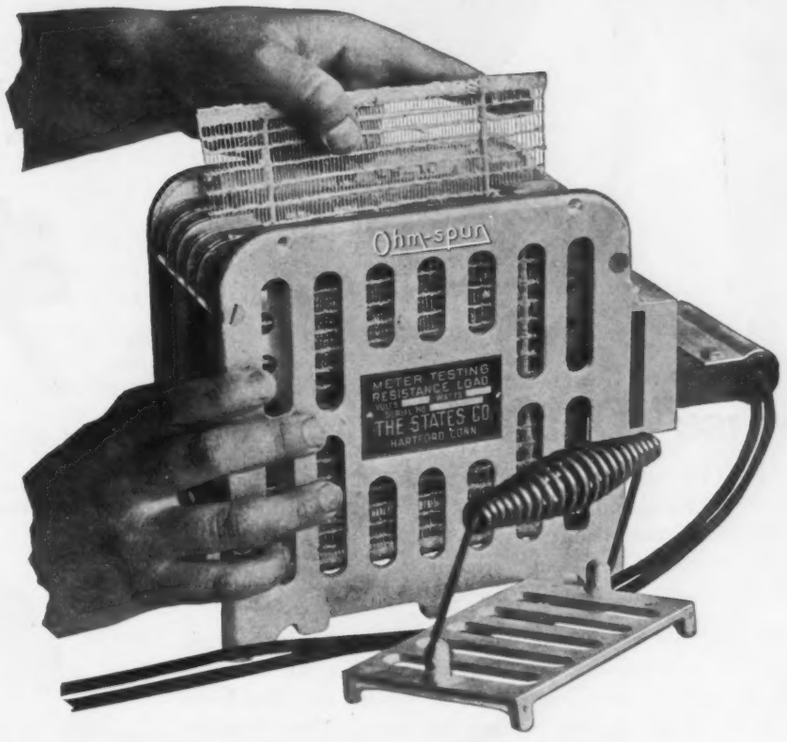
We will be glad to tell you about the exclusively Benjamin sales-making, money-making features of these two-way plugs.

BENJAMIN ELECTRIC MFG. CO.

847 W. Jackson Blvd., Chicago
247 W. 17th Street, New York
580 Howard Street, San Francisco

Ask our nearest office for full information about these unusual "Show and Sell" stands and how to save and make more money on our maximum discount purchase plan

Something You've Been Waiting For!



Ohm-spun

Resistance Load

A new resistance load for meter testing.

LIGHT — COMPACT — REPLACEABLE UNITS

With minimum weight, maximum ventilation, easily replaced, non-inductive resistors and no fragile parts to break the Ohm-spun load will appeal to you.

Made for 10 amperes and up.

Ready for use

Send us your requirements and we will send complete information and prices.

THE STATES COMPANY

43 Francis Ave., Hartford, Conn.

Ohm-spun resistor

Does Not Crumble!

This is the way the black molded type of attachment plug looks after a few months of hard usage. The "A-1" plug will not crumble in this manner.

A-1 PLUG
"Not cheaper but better"

It's Brown

Try this Experiment with other Plugs

FIRST—*Bend the contact prongs of the "A-1" plug outward, until they extend well over the edge of the cap—see illustration.*

SECOND—*Pull the prongs together again until they are back in their normal position.*

This Is What Happens!—

After repeated bending in this manner, the prongs of the ordinary black-molded plug become loosened to the extent that they can be wobbled about in the cap, thereby making them difficult to engage in the body slots.

With the "A-1" plug, the prongs are riveted so securely in the Bakelite material that after repeated bending they remain perfectly rigid.

Mr. "Wise" Dealer!

We have tried to point out some of the advantages of our all-Bakelite attachment plug over the commonly known type of black moulded material in the accompanying illustrations and we will venture to say many of you will appreciate this advertisement from a sensible standpoint because you have experienced this trouble in your own homes.

Owing to the great tensile strength of Bakelite as compared with black moulded material, we are enabled to rivet the prongs of the cap to the solid inserts in such a manner that these prongs may be twisted back and forth until they break off before they become loose on the inserts. Other features and improvements incorporated in our new plug make it so attractive to the consumer that everything else being equal, it will "swing" the sale and incidentally make another satisfied customer.

Some dealers argue that it makes more business for them by replacing plugs. Granted—but what chance has this fellow got to stay in business if his competitor next door is creating new business by recommendations from satisfied customers. Therefore, Mr. "Wise" Dealer, when placing orders for any kind of appliances (especially expensive devices), such as washing machines, vacuum cleaners, dish washers, etc., insist upon having the extension cords fitted with the "A-1" Bakelite plug, because it will only be a question of time before all high-grade appliances will be equipped in this manner. They say you can tell a person by the "company he keeps"—just so you can tell a concern by the "quality it selects." The Connecticut "A-1" all-Bakelite brown plug is in a class by itself. The color identifies it from the cheaper grades.

The "A1" Plug is packed in this 3-color display carton

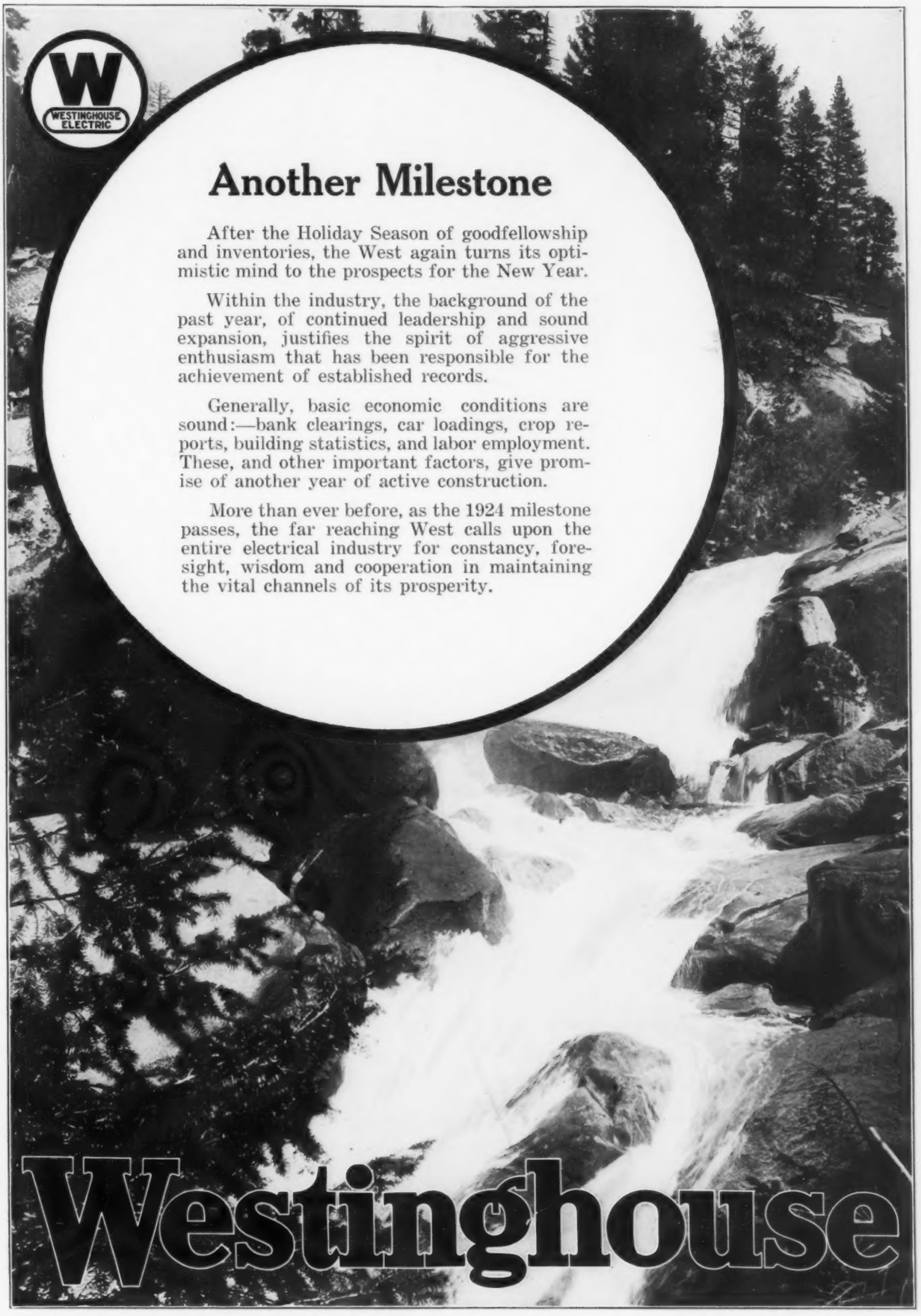
CONNECTICUT ELECTRIC MFG. CO.

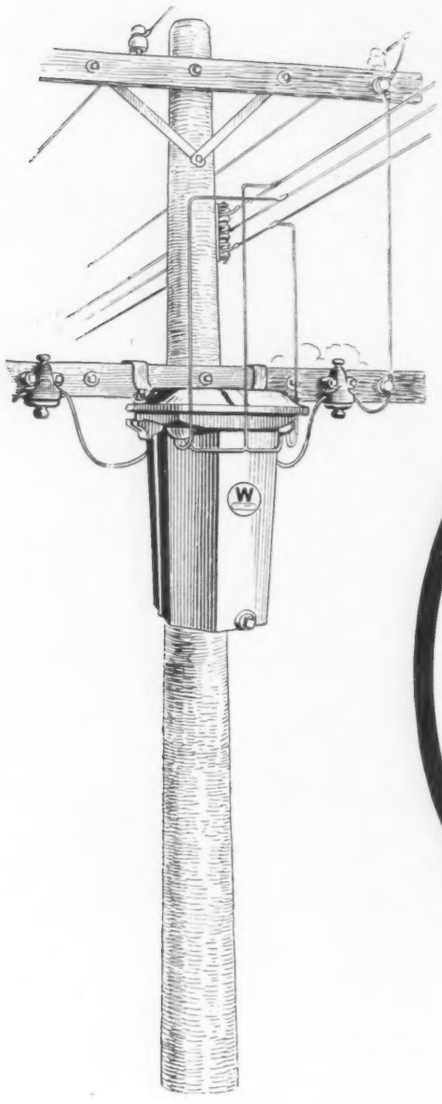
BRIDGEPORT, CONN.

NEW YORK CHICAGO SAN FRANCISCO

Manufacturers of

CONNECTICUT "A-1" DEVICES


W
WESTINGHOUSE ELECTRIC
Another Milestone
After the Holiday Season of goodfellowship and inventories, the West again turns its optimistic mind to the prospects for the New Year.
Within the industry, the background of the past year, of continued leadership and sound expansion, justifies the spirit of aggressive enthusiasm that has been responsible for the achievement of established records.
Generally, basic economic conditions are sound:—bank clearings, car loadings, crop reports, building statistics, and labor employment. These, and other important factors, give promise of another year of active construction.
More than ever before, as the 1924 milestone passes, the far reaching West calls upon the entire electrical industry for constancy, foresight, wisdom and cooperation in maintaining the vital channels of its prosperity.
Westinghouse



The Type S Distribution T
High Service Standards A

10 KVA. Type S Transformer with the core removed from the tank.

Mica-Micarta Barriers

A distinctive feature of the Type S Transformer is the Mica-Micarta barrier construction between the high-voltage and low-voltage coils, as well as between the iron and the inner low-voltage coils. The barriers used in 2300-volt transformers will resist failure up to 70,000 volts when tested under oil—an ample margin for safety.

Mechanical Details

Not only has great care been given to develop a neat and well-finished exterior appearance, but all the mechanical details of Westinghouse Distribution Transformers have been arranged to secure convenience and economy of installation, inspection, and storage, as well as sufficient strength and insulation to assure satisfactory operation.

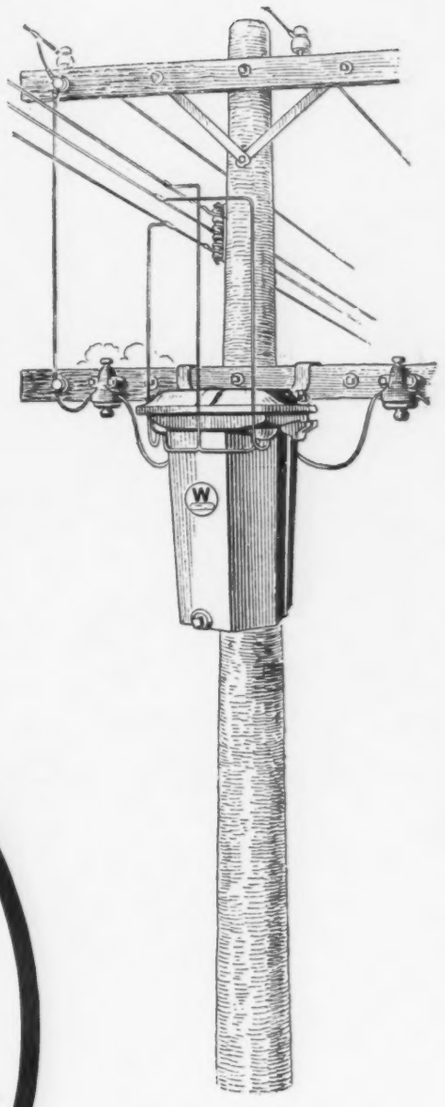
Westinghouse Electric & Manufacturing Company
Newark Works, Newark, N. J.

Westinghouse

Transformer Maintains Along the Entire Line

Although there is nothing of the spectacular in the operation of the distribution transformer, its successful operation at all times is of great importance because of its direct relation to individual current consumers. And to meet the many and varied needs of distribution service, Westinghouse has developed eleven distinct types of low-tension transformer, each type better than any of the others for certain specific uses.

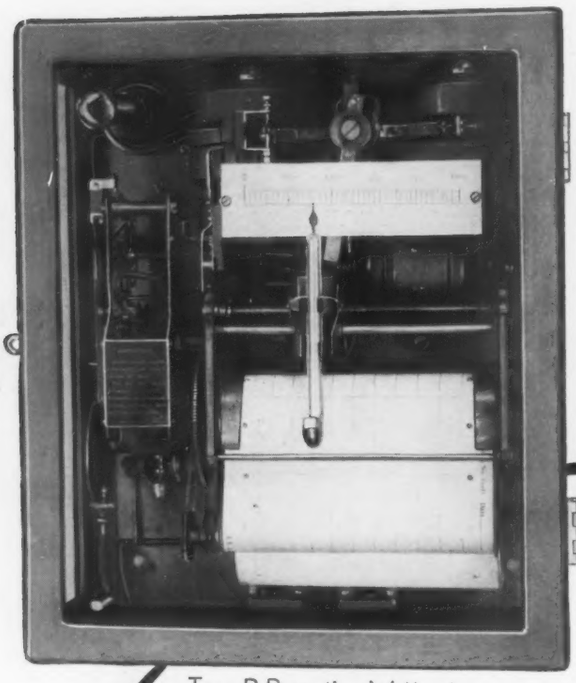
Westinghouse engineering specialists in each district office will be glad to consult with you at any time concerning the types best adapted to each part of your system.



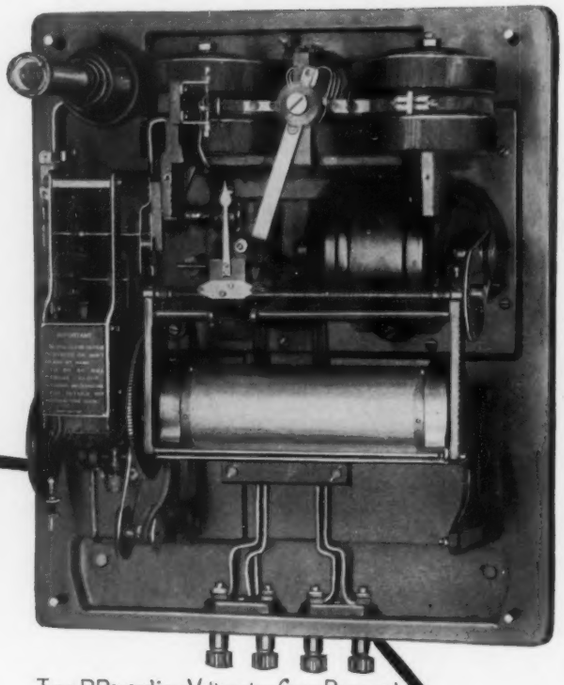
A cross section of the iron and coils of a 10-kva. Steel Clad Type S Transformer, showing the position of the Mica-Micarta barriers between the inner and outer low-voltage windings and the high-voltage windings. Fuller-board washers separate the four coils of the high-voltage windings.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Westinghouse



Type R Recording Wattmeter



Type R Recording Voltmeter, Cover Removed

New Type R Recording Instruments Have Many Distinct Advantages

For purposes of careful analysis of power demand or for recording total power output, Westinghouse Type R Recording Instruments serve in many ways.

The portable, switchboard, and wall types can be used to indicate the total power generated by central stations, to record maximum demand, line voltage, station curves, arc circuits, electrolysis, motor tests, electric traction investigations, etc.

Some outstanding advantages of this line of instruments are: Improved zero test—Stronger calibrating spring—Improved pen carriage—Larger control motor—Improved re-roll mechanism—Large, accessible terminal studs.

In addition, these instruments find application for many special engineering investigations and for recording the performance of large apparatus using electric power. Leaflet 20049 gives full particulars regarding the instruments, their use and application.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Butte, 52 East Broadway
Denver, 910 Fifteenth St.
El Paso, Mills Building
Fresno, Griffith-McKenzie Bldg.
Los Angeles, 420 S. San Pedro St.
Portland, Porter Bldg.
Salt Lake City, 2nd South and Main Sts.
San Francisco, 1 Montgomery St.
Seattle, 3451 E. Marginal Way
Spokane, 821 Old National Bank Bldg.
Tacoma, 615 Rust Bldg.
Tucson, Immigration Bldg.

Westinghouse

THEY PUT GLOLOGS OVER BIG IN CHICAGO

Commonwealth-Edison Show Window

Be sure your plans for new homes and apartments include wiring for GLOLOGS as this extra cost is almost negligible.

THE COMMONWEALTH EDISON CO. of Chicago recognizing the sales possibilities of GLOLOGS picked their star salesman and made him manager of the **GLOLOG DEPARTMENT.** They preferred their own folders and literature advertising GLOLOGS and these booklets were sent everywhere in Chicago. Their GLOLOG manager called personally on contractors and architects and today the consumer demand and sales for GLOLOGS in and around Chicago is tremendous.

It's one of the most successful campaigns the Commonwealth Edison Co. has ever conducted and their customers are happily sold on

Comfortable and Companionable Heat

And don't overlook this:

Commonwealth Edison Co. keeps almost constantly a window featuring a GLOLOG Display.

The economy of installation of "GLOLOGS" is instantly recognized—for the reason that they require no flue or vent and a falsework can be used for the mantel construction, in fact any type of chimney piece or fireplace can be arranged for without heavy brickwork or concrete.

Many apartment houses have specified "GLOLOGS" on this account and also because they do not take up too much space and they are an ideal instant heater for all weather conditions.

Chicago dealers are now alive to "GLOLOG" possibilities and profits. And if "GLOLOGS" are ideal as heaters in such cold lake cities as Chicago they are ideal anywhere in the country—and Chicago sales can be duplicated anywhere.

Let us tell you how to put over a successful "GLOLOG" campaign.
Write for full details to our Western Distributors

ATLANTIC-PACIFIC SALES CO., 646 Mission St., San Francisco

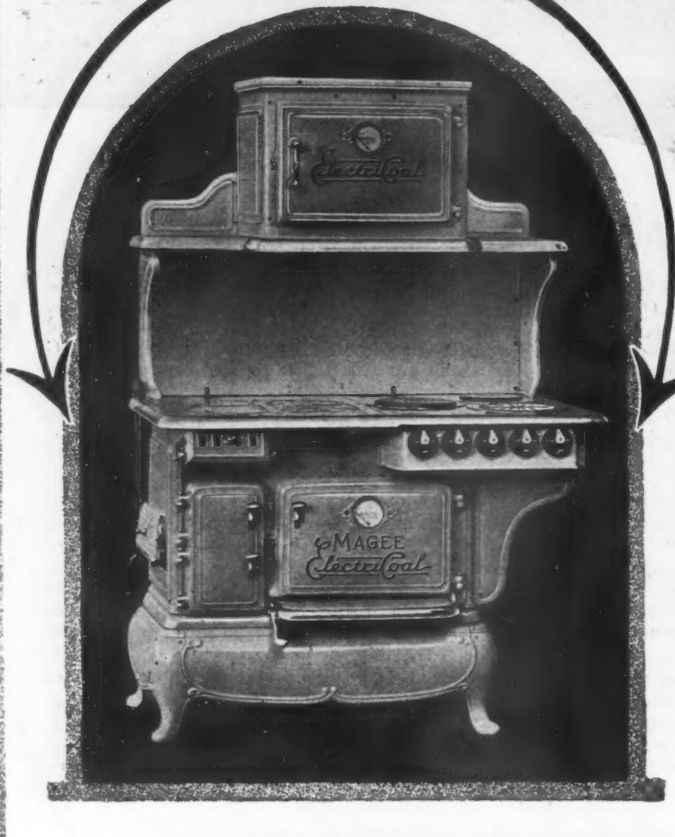
We carry a stock of GLOLOGS in San Francisco

STRAIT & RICHARDS, Inc.

Selvage Street, Newark, N. J.

GLOLOG ELECTRIC FIREPLACE HEAT

A Range with a Double Service



MAGEE ElectriCoal

and it sells!

—and sells another

The Magee ElectriCoal Range offers exclusive conveniences found in no other range. Two complete ranges in one complete form. A coal range—and an Electric Range.

This range has an enormous cooking capacity, as any part or all can be used at the same time.

The dealer who sells the Magee ElectriCoal has a non-competitive product that makes good.

Agencies offered in many territories. For particulars write

MAGEE FURNACE COMPANY
BOSTON, MASS.

THE T. G. ARROWSMITH CO., Western Representative, 135 New Montgomery Street, San Francisco, Cal.

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WE want to place these books in your hands for 10 days' Free Examination. No expense to you—we pay all the charges—take all the risk.

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Electrical Maintenance and Repair—

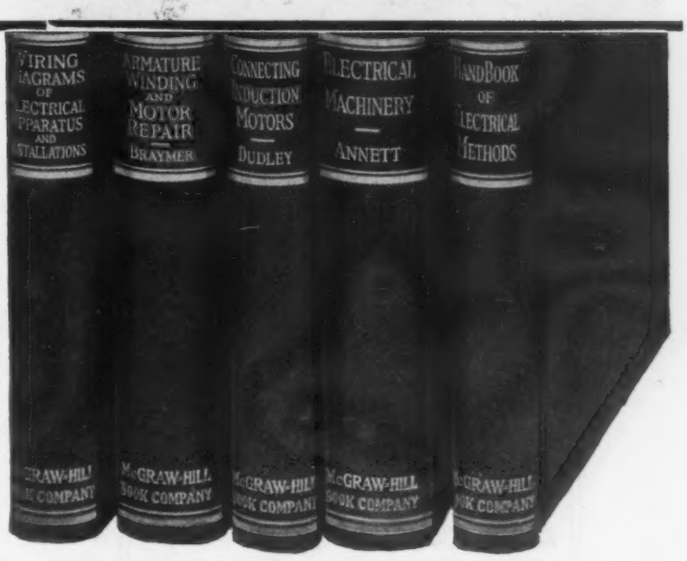
5 volumes—1736 pages—1818 illustrations—library binding

THESE five volumes contain the largest collection of practical methods for electrical repair and maintenance men ever put together in book form.

Every one of the books is jammed from cover to cover with good, sound, how-to-do-it information—the kind you have to have when anything goes wrong.

They cover every phase of electrical repair and maintenance work from armature winding to the correction of brush troubles. And the treatment is always from the practical man's standpoint.

Fundamental laws and rules are discussed when necessary but there is no hard-to-understand theory or discussion of design. All of the material presented in these five books has been obtained from actual experiences. The library outlines the practical remedies that have been applied by repairmen all over the country in the solving of puzzling electrical problems.



These books tell you

How to replace commutator segments—
How to connect an induction motor winding to meet any condition of voltage, phase, frequency and speed—
How to check this reconnection to know if the motor will operate under the new condition—
How to draw a diagram for any winding—
Ten most common defects in windings—
How to locate defects—
How to figure a new winding for an old core—
How frequency affects winding and r.p.m.—
How performance is affected by a change in winding—
How to find out what the trouble is when a motor or generator will not run—
How to remedy the trouble—
How to keep electrical machines in first-class operating condition—
How to re-arrange a three-wire system to reduce voltage fluctuations—
How to test meters—
How to turn down a commutator—
How to insert spare transformer in star-delta group—
How to remove defective field coils—

And hundreds of other practical methods and kinks

Seven good reasons why you should have these books

1. The five books in this library discuss actual repair jobs and show you step by step what to do when anything goes wrong.
2. They show you how to locate and remedy motor and generator troubles.
3. They show you how to reconnect motors to meet any condition of voltage, phase, frequency and speed.
4. They give you suggestions for preventing electrical machinery troubles.
5. They cover the rewinding of motors.
6. They present information that will help you get better service out of your electrical equipment.
7. They give you tables, data, kinks that you will find of priceless value every day on every job.

—no money in advance

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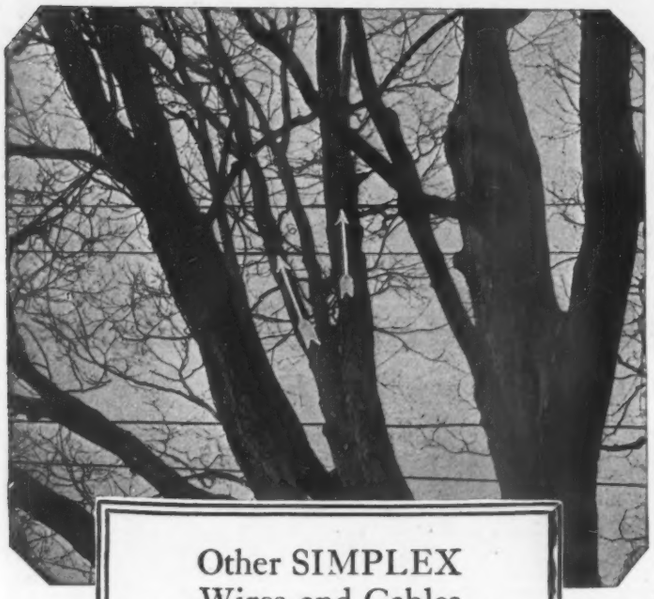
If you keep these books after looking them over send us $2.00 in ten days. The balance may be paid in monthly instalments of $2.00 until the price of the library—$14.00—is paid. Send for the books today. Fill in and mail the coupon. No money down—no agents. You simply agree to return the books, postpaid, in ten days or remit for them on our convenient monthly payment plan.

McGraw-Hill Book Co., Inc.,
370 Seventh Ave.,
New York.

Gentlemen:
Send me the **LIBRARY OF ELECTRICAL MAINTENANCE AND REPAIR** (shipping charges prepaid), for 10 days' free examination. If satisfactory, I will send $2.00 in ten days and $2.00 per month until the special price of $14.00 has been paid. If not wanted, I will write you for return shipping instructions. (Write plainly and fill in all lines.)

Name .....
Home Address .....
City and State .....
Employed By .....
Occupation O-1-1-24



When you're up a tree —FIBREX

Fibrex Tree Cable preserves uniform line voltage; eliminates grounds with their consequent dangers; cannot become a menace to workmen because the fibre armor absolutely will not carry dynamic or static charges.

Fibrex is less expensive than ordinary wires protected by battens, insulators or other devices, and tree trimming can usually be avoided.

The non-metallic armor has the wearing qualities of steel with none of its disadvantages.

Made for all commercial voltages
Sample on Request

Other SIMPLEX Wires and Cables

SIMCORE—National Electrical Code Standard. Every length is subjected to searching electrical tests to insure a first quality product. Ask for specifications.

CAOUTCHOUC—"B. C." A rubber covered, braided wire, insulated with a 30 per cent Para compound. Send for specifications.

LEAD COVERED CABLES AND WIRES—For under-ground distribution where a conduit system is used.

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TIREX PORTABLE CORD—For electrical tools and appliances. Rubber-armored. Flexible. It cannot kink,—and has the wearing qualities of a cord tire.

TIREX MINERS' LAMP CORD — Extremely flexible and long-lived cord designed to meet the peculiar condition of lamp service in mines.

TIREX LAMP CORD—A rubber-armored cord for drop lights or table lamps, made in colors. Send for folder.

SIMPLEX WIRE & CABLE Co.
MANUFACTURERS
201 DEVONSHIRE ST. BOSTON 9
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TRADE **FIBREX** MARK

THE TREE WIRE THAT PREVENTS LINE LEAKAGE

"The Towers That Go Together"

Hot Dip Galvanized
Bolts and Nuts

"I Like These Galvanized Bolts from Pacific Coast Steel Company"

—says the Erection Foreman.

The Story of Service

Detail Drawings
Erection Diagrams
Testing the Fit
Shop Fabrication
A Better Galvanized Surface
The Hot Dip Process of Galvanizing
The Testing Block
√ **Bolts and Nuts**
Bundled and Ready for Shipment

"The bolt threads are cleaned after galvanizing and nuts retapped to insure finger fit the full length of thread.

"**SUPPOSE THEY DIDN'T FIT.** Either the boys have to lay to with a wrench in each hand and waste several minutes running down each nut, when they should be able to spin them down by hand and tighten with one or two pulls, or — 'blankety blank' — back goes an arm, and

"**BOLT AND NUT ARE THROWN AWAY.** Bolts and nuts that do not fit waste time and boost the cost of the job just that much. If too many do not fit, the work has to stop while we wait for more to be shipped in."

EVERY BOLT AND NUT furnished by Pacific Coast Steel Company for Transmission Structures is Hot Dip Galvanized and retapped to finger fit.

PACIFIC COAST STEEL COMPANY

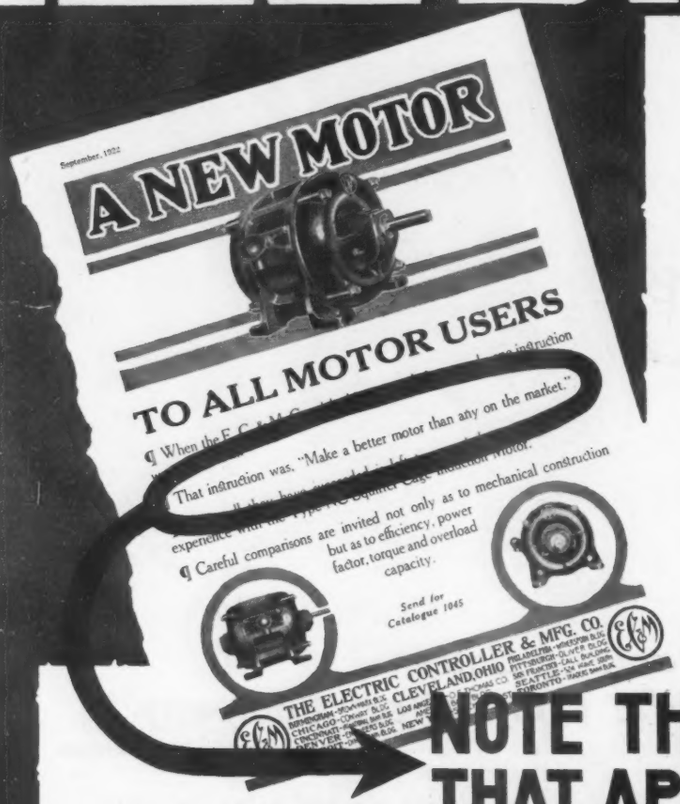
MANUFACTURERS OF

OPEN HEARTH STEEL

STRUCTURAL SHAPES MERCHANT AND REINFORCING BARS
TRANSMISSION TOWERS AND STRUCTURES

Gen'l Office: Rialto Bldg., San Francisco Plants: San Francisco, Portland, Seattle

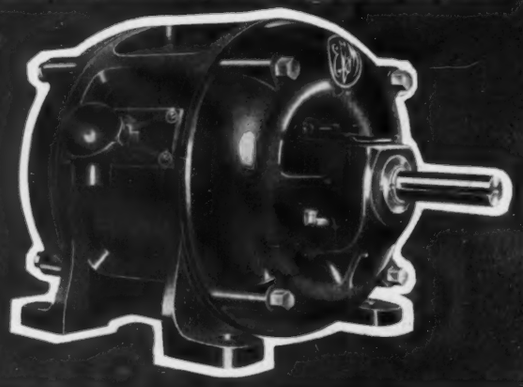
HERE IS PROOF


A NEW MOTOR
TO ALL MOTOR USERS
That instruction was, "Make a better motor than any on the market."
Careful comparisons are invited not only as to mechanical construction but as to efficiency, power factor, torque and overload capacity.
Send for Catalogue 1045
THE ELECTRIC CONTROLLER & MFG. CO.
CLEVELAND, OHIO

A YEAR AGO IN SEPTEMBER THE FIRST TYPE NC SQUIRREL CAGE INDUCTION MOTORS WERE SOLD AND DELIVERED. THE FIRST ADVERTISEMENT IS SHOWN HERE.

NOTE THE SENTENCE THAT APPEARED THEN

DURING THE PAST 16 MONTHS TYPE NC MOTORS HAVE BEEN BUILT AND PUT IN TO THE HARDEST SERVICE, IN MANY CASES WHERE OTHER MOTORS HAD FAILED, AND



NOT A MOTOR HAS FAILED

THE ELECTRIC CONTROLLER & MFG. CO.
CLEVELAND, OHIO

FOR SOUTHERN CALIFORNIA:
O. E. THOMAS,
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C. F. HENDERSON,
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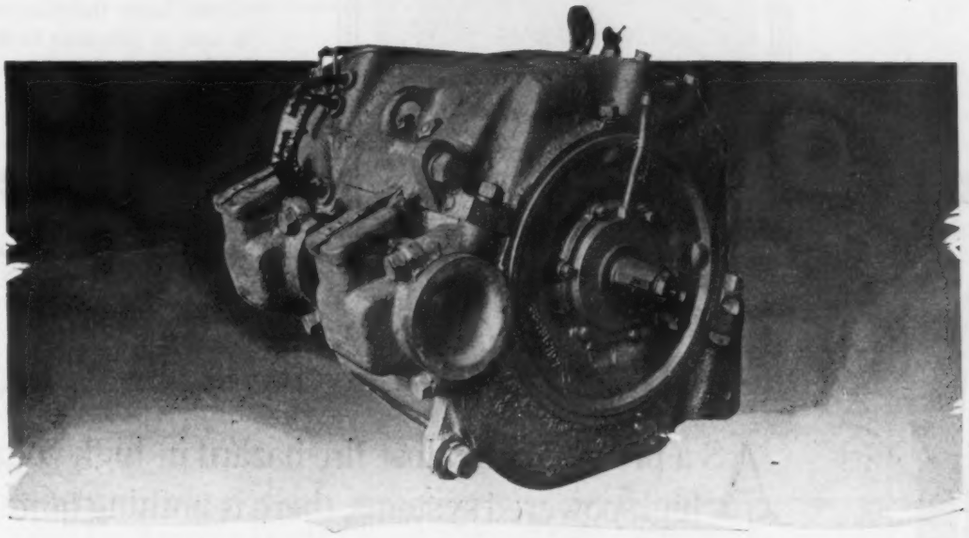
SKF



Minimum Attention Required

By Ball-Bearing Equipped Electric Motors

WITH Skayef self-aligning ball bearings on the rotors of rotating electrical machinery maintenance and repairs are reduced to a minimum.

Ball-bearing housings can be more satisfactorily arranged for the retention of the lubricant and the exclusion of foreign matter than can plain-bearing housings. As a result commutator troubles and short circuits due to leaking lubricant are avoided and fewer applications of lubricant are required.

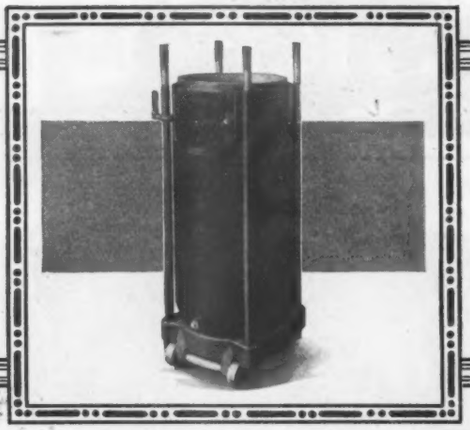
Furthermore self-aligning ball bearings require no adjustments, as they will not bind, heat or develop appreciable wear in service when properly housed. Thus the electrical elements of a ball-bearing equipped motor are protected against short-circuits and other damage due to dropped armatures.

Because of their demonstrated superiority of performance and maintained precision, **SKF** marked ball bearings are in extensive use throughout the world on rotating electrical machinery of all kinds. May our engineers co-operate in bringing the advantages of ball bearings to your machines?

SKF Industries of California, Inc., 115 New Montgomery St., San Francisco, Cal.
(A Complete Line of Radial and Thrust Ball Bearings Carried in Stock)
Telephone Sutter 4196
1069 **Los Angeles Branch: 1114 South Hope Street. Telephone 875-365.**

Normal View *Deflected View*

BALL BEARINGS
The Highest Expression of the Bearing Principle



A secondary tank designed to afford protection against oil and flame throwing even in case of puncture to inner tank. Sometimes called "double" or "spill" tank.

Double Tank

AS a protection against fire-hazard in high-voltage, high-powered systems, there is nothing quite the equal of "double" tank construction.

They are designed to prevent cell fires—even in case of puncture to inner tank.

They reduce dangerous flame throwing.

They condense and isolate the gases.

They require no additional cell construction and for most installations no additional space.

CONDIT "double" tanks—and they're exclusively a CONDIT feature of design and construction for single unit, common frame or truck type oil circuit breakers—reduce fire-hazard to a minimum and provide low cost insurance. Specify them.

"Get in touch with CONDIT."

CONDIT ELECTRICAL MFG. CO.
Manufacturers of Electrical Protective Devices
South Boston, Mass.
Northern Electric Company
Represented by The H. B. Squires Co. in Seattle, San Francisco and Los Angeles

6111

CONDIT
Features

1. "Double" tanks.
2. Energy Absorption.
3. Self-contained mufflers.
4. Massive rigid frames.
5. Laminated contacts.
6. Truck type units.

CONDIT

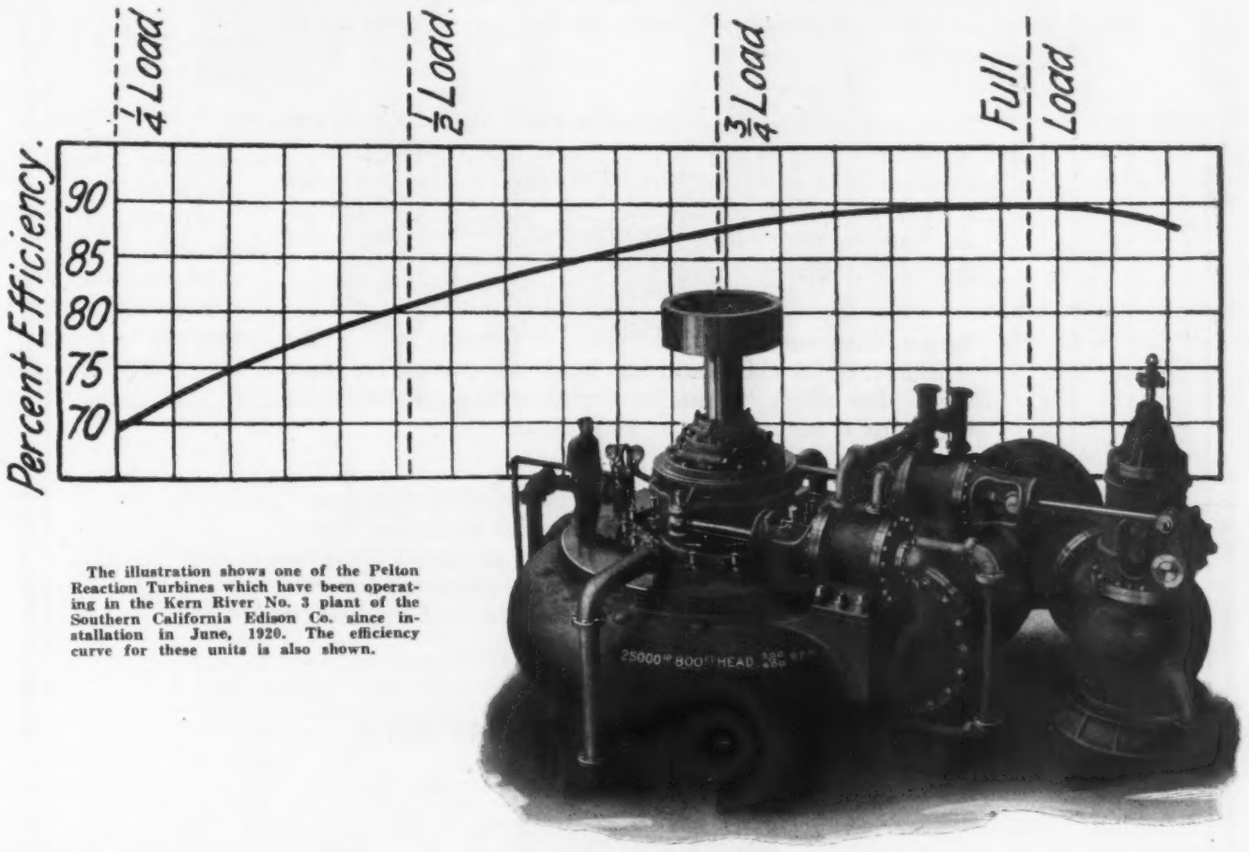
PELTON

It's the Efficiency that counts

And Efficiency is an Attribute of Design. Perfected Design is a Product of Experience and Thoroughness

The engineer's eye is quick to note the significance of the "curve" shown below. It conveys a meaning that words fail to express. TIME EFFICIENCY, in relation to total kw.-hr. output, is an equally important factor—one which receives utmost consideration in design and manufacture.

The outstanding success of these turbines has led to the construction of similar types for the Oak Grove project of the Portland Ry. Light & Power Co. and the Pit No. 3 plant of the Pacific Gas & Electric Co. The latter two orders are now being filled.



The illustration shows one of the Pelton Reaction Turbines which have been operating in the Kern River No. 3 plant of the Southern California Edison Co. since installation in June, 1920. The efficiency curve for these units is also shown.

The Pelton Water Wheel Company

Hydraulic Engineers

1991 Harrison St., San Francisco — 100 Broadway, New York, N. Y.

Associated Companies:

Wm. Cramp Ship & Engine Bldg. Co.
I. P. Morris Department Philadelphia

Dominion Engineering Works, Ltd.
Montreal, Canada

PELTON

RECOGNITION

THE fittest survive. Among men, methods, materials —only those best equipped for the conditions of the race—only those having certain qualities required for successful service are present at the top of the heap after having been fairly "weighed in the balance."

This principle, or law, is broadly applicable to industry. Each generation brings changed conditions and sterner requirements. Methods must be revised and materials must be improved in order to survive in this race of progress.

It is rare, indeed, that an industrial product which was popular forty, even thirty, years ago, fulfills today's needs. Those leaders that have maintained their position over a number of years have kept in advance of, at least in step with, the demands of the times for better service.

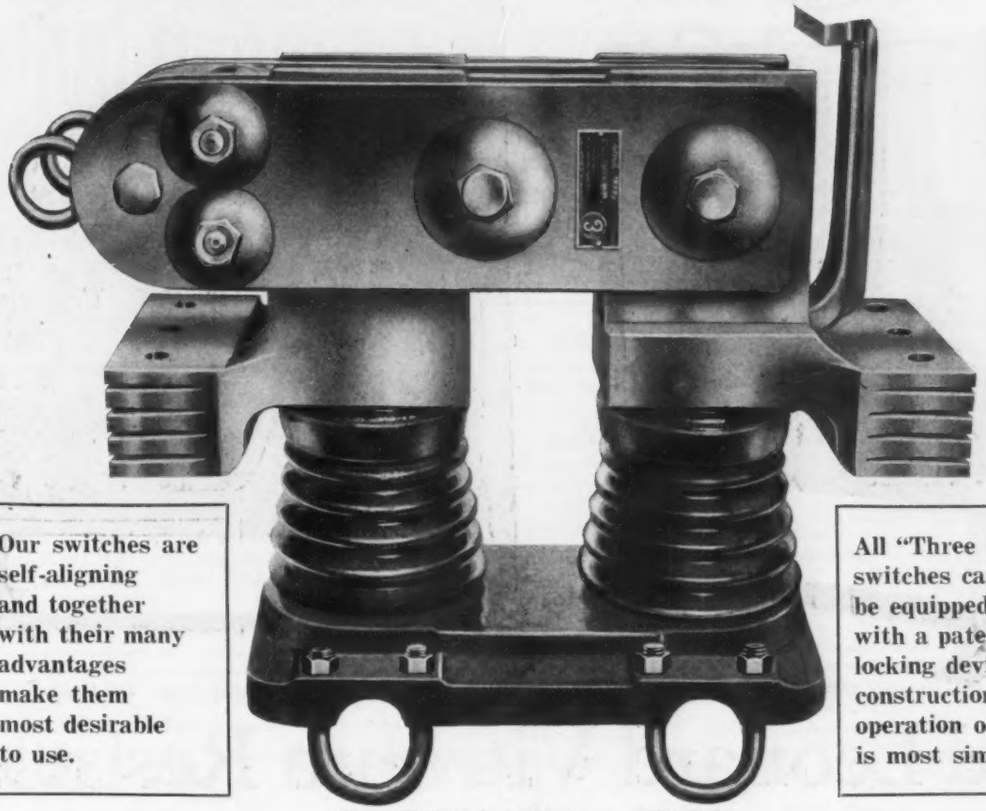
When any material has attained recognition as the standard of its class, and has held its position for more than fifty years, it merits the general approbation of the fields it serves.

In return for the recognition accorded "*National*" Pipe, the organization responsible for its manufacture is pledged to further promulgate the policy of progress that has been responsible for the elevation of this material to its position as the *Recognized Standard of Wrought Pipe.*

NATIONAL TUBE COMPANY

Frick Building, Pittsburgh, Pa.

"Three E" Double Blade Switches Have no Resistance Producing Joints



Our switches are self-aligning and together with their many advantages make them most desirable to use.

All "Three E" switches can be equipped with a patented locking device, construction and operation of which is most simple.

Three E Switch, 5,000 Amp., 7,500 Volts

Developed on fact

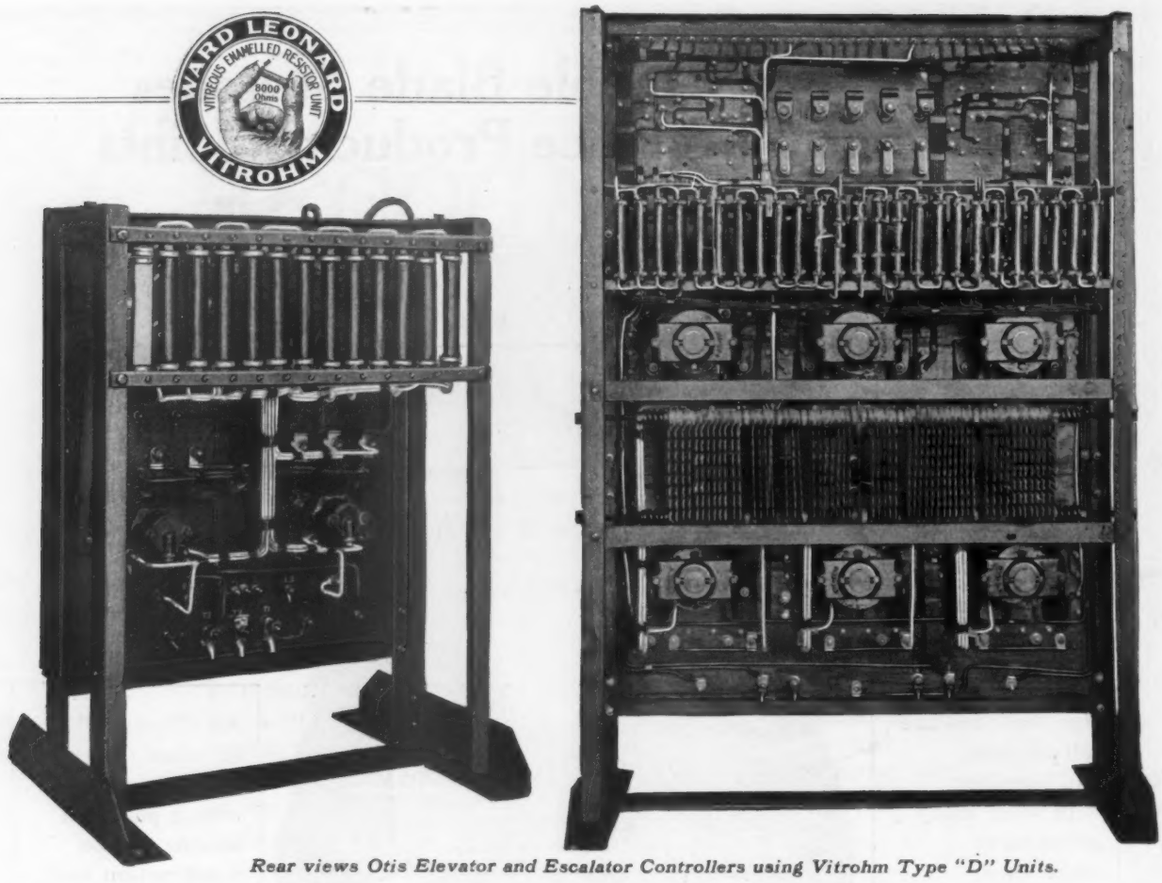
The "THREE E" Double Blade Switches were developed to overcome certain service troubles of long duration. Notice the absence of joints. This has eliminated the resistance such joints produce. This is done by casting the tongue, clip block, and studs of one piece of solid cast copper. Double blade construction is also a vital factor in their efficient functioning. This means a parallel grip on clip blocks assuring absolute true contact. Spring washers made of Phosphor bronze are used to obtain this result. Furthermore, it also gives double radiating surface, insuring cooler operation.

Maybe you would like to confer with one of our engineers. This will entail no obligation on your part. We would be pleased to be of service to you.

ELECTRICAL ENGINEERS EQUIPMENT CO.
General Offices: 710 W. Madison St., Chicago, Ill.

WESTERN OFFICES—
310 E. 4th St., Los Angeles, Calif. · 321 Rialto Bldg., San Francisco, Calif. · 317 Alaska Bldg., Seattle, Wash. · 257 S. Main St., Salt Lake City, Utah · 1633 Tremont St., Denver, Colo.

"THREE E"
HIGH QUALITY
LINE AND STATION EQUIPMENT



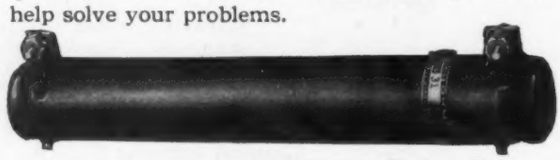
Rear views Otis Elevator and Escalator Controllers using Vitrohm Type "D" Units.

Ward Leonard Vitrohm Resistors

used in the controllers of

Otis elevators and escalators

RIGID requirements of city and state demand that every precaution of design and quality in elevator construction shall be taken to assure safety. For many years Otis Electric Elevators have been pre-eminent in the elevator field because of their superior safety and reliability in service. The use of Ward Leonard VITROHM Resistor Units in the controllers of Otis Elevators is significant of the dependable character of these resistors in severe, exacting and responsible service. Wound on a special porcelain-like body of great strength, the resistance elements of Ward Leonard VITROHM Units are sealed in glass-like tough vitreous enamel—perfectly and permanently protected against oxidizing or corroding moisture or gases. The value—like the dependable service—of Ward Leonard VITROHM Resistors is a fixed quantity. Let Ward Leonard resistance specialists help solve your problems.



Ward Leonard Type "D" Vitrohm Resistor Unit with screen terminals

Electric Material Company, Agent

589 Howard St., San Francisco
Consolidated Bldg., Los Angeles
Hinckley Bldg., Seattle

for Ward Leonard Electric Company
Mount Vernon, New York

9020

DIRECTORY of ENGINEERS

The Journal of Electricity's selected list of Engineers equipped to handle Hydro-Electric and Industrial Development now under way in the West

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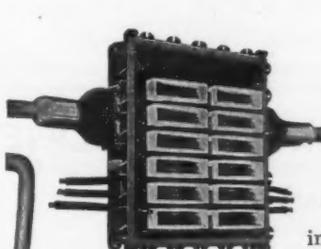

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Cable Accessories
include Junction and Joint Boxes, Outdoor and Indoor Cable Terminals, "Ozite" Insulating Compounds, etc. They are standard in quality as well as in name.
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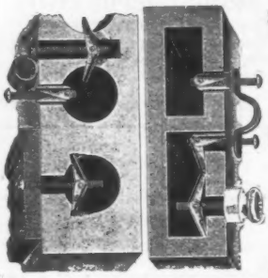

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can well afford to patronize those registered on these pages as it is evidence of mutual co-operation in the upbuilding of the West.

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Manufacturers of out-door lighting fixtures of every description.

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Radiant Convection Type
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(Flush, Portable, Bracket & Fireplace Types)

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Electrical supplies for every requirement

"SERVICE" our Motto

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you reach a tremendous buying power. Our advertising service department is ever anxious to serve the needs of Journal advertisers in any way possible. Let this department cooperate with you in preparing copy, in order to get the best results from your advertising.

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May we help you in problems involving the use of Fibre?

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HEMINGRAY GLASS CO.

Office: Muncie, Indiana

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Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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5 to 10 inches..... 3.40 an inch
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An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

J. of E.

DISTRICT REPRESENTATIVE WANTED

for territory west of Denver by well known washing machine manufacturer. Consideration will only be given those showing conspicuous selling record in this line calling on distributors and large dealers. For such an experienced man there is an unusual opportunity with this fast growing, aggressive organization. Give complete details in confidence as to age, past performance, and salary expected.

HAAG BROS. CO., Peoria, Ill.

Get your Wants into the Searchlight

IF YOU WANT

Electric Motors and Generators
Electric Control Equipment
Industrial Plant Equipment
Motor Trucks and Trailers
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Transformers — Circuit Breakers
Equipment for Mines
Used Machinery of Various Kinds

PLACE YOUR AD IN

SEARCHLIGHT SECTION

JOURNAL OF ELECTRICITY

and get in touch with the man who has the equipment for sale

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WANTED—Hydro-electric plant superintendent thoroughly experienced in operation and maintenance and to take charge fair sized plant near the most progressive city in West Indies. Anyone applying should be willing to make himself useful all around. Comfortable living quarters, healthful climate, excellent opportunity. Box 18, Journal of Electricity.

Wanted Live Representatives

By manufacturer of ammeters and voltmeters of both pocket and small switchboard or panel types; also audio transformers. Box 20, Journal of Electricity.

In Replying to "Blind" Ads

be careful to put on the envelope the key number of the ad, the name of the publication and address, thus:

P 17—
Journal of Electricity,
883 Mission Street,
San Francisco, Cal.

Important.

Original letters of recommendation or other papers of value should not be sent to unknown correspondents—send copies.

At Your Service—

A service wherein the man who is seeking a position or the man who is desirous of obtaining trained men; where information can be found concerning either the purchase or disposal of new and used electrical equipment. The purpose of the *SEARCHLIGHT* section of the *Journal of Electricity* is to render this service. It simply remains for the men in the electrical industry in the West to apply this service to their needs.

For Every Business Want—Think *Searchlight* First

The Impression

you make upon your business associates is of vital importance to your success. The same is true of your

Stationery and Printing

- Filing Cabinets
- Loose Leaf Devices
- Card Files
- Stationery
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- Carbon Paper
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The careful selection and proper arrangement of type, paper stock, and colors that will make the positive impression you desire, is a part of our service to you.

And our large stocks of office supplies include many items that you need for routine business.

Let us demonstrate what we can do for you—at your convenience.

Neal, Stratford & Kerr

The Best in Stationery

521 Market St. San Francisco

Phone Sutter 5886

Shelton's Violet Rays and Vibrators

MR. DEALER:

We carry in stock **SHELTON'S** complete line of Violet Ray Apparatus and Vibrators.

Pacific States Electric Co.

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DUNCAN

A. C. Watthour Meters

Buying a meter is like buying a watch. The man who needs a watch, if he's wise buys a good one and thereafter expects it to run without more than once-a-year cleaning.

Simplicity, skillful design, and careful manufacture have made the present-day watch a graceful and utilitarian combination familiar to us all. Meters, the same way.

The thing to think about here, of course, is the wisdom of securing **good** meters in the first place, in order to secure service unhampered by excessive maintenance, costly repairs or more costly inaccuracies.

Duncan Watthour Meters **are** good meters. Ask our representatives to prove it.

Duncan Electric Mfg. Co.

Lafayette, Indiana

Individual Control of Lighting Units

We want you to see for yourself the advantages of the Levolier Conduit Box and Fixture Switch in giving individual control to lighting units. Easily installed, permanently satisfactory. A sample will be sent to you on request.

Approved by Underwriters' Laboratories

Levolier

Conduit Box and Fixture Switch

Sturdy, small in size and low in cost, this switch is the most satisfactory switch to give individual control to lighting units. Easy to wire. Gives lasting satisfaction. Saves money.

Each switch supplied with 6 feet of linen cord, short chain and composition ball. Washer for knockout of conduit box also furnished without extra charge.

Cat. No.	Stem Diameter	Stem Length	List Each
61	7/16 in.	3/16 in.	$ .55
61S	7/16 in.	3/16 in.	.55
62	7/16 in.	3/8 in.	.60
63	7/16 in.	3/4 in.	.60

No. 61S for brackets and electrical appliances of all kinds where individual control is desired.

No. 61
6A-125V—3A-250V

Levolier

Canopy Switch Hickey

Made especially for use with the Levolier Switch. Serves both as a switch support and hickey. May be attached directly to the main support of the fixture thereby relieving all strain on the canopy.

A chain guide is supplied with each hickey without extra charge.

Cat. No.	Size	List Each
64	3/8x3/8 in.	$ .10
64A	3/8x1/4 in.	.10

No. 64

NEWS NOTE—Now send for your samples. There is no obligation. Just try them out and see how satisfactory they are. Write, today.

J. G. POMEROY
336 Azusa Street Los Angeles, Cal.

Levolier Pull Sockets Pull Hooks Conduit Box, Fixture, Lever, Pull and In-Between Switches Hickeys

McGILL MANUFACTURING CO.
Electrical Specialties of Quality
ESTABLISHED 1904
VALPARAISO · INDIANA

Lamp Guards Lamp Coloring and Frosting Soldering Flux Blow Torches Lamp Changers

CHAS. C. MOORE & CO. ENGINEERS INC.

Contractors for Complete Plants

HIGH GRADE MACHINERY

The Babcock & Wilcox Water tube boilers
Corliss, High Speed, and Poppet valve engines
Babcock & Wilcox superheaters
Nordberg hoists and compressors
Green's fuel economizers
Wheeler Condenser & Engineering Co. Condensing machinery
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Cochrane feed water metering heaters
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Reilly evaporators, distillers and feed water heaters
Criscom-Russell multiwhirl coolers
Moore automatic fuel oil regulators
Diamond soot blowers
Lagonda tube cleaners
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Lagonda automatic boiler stop valves
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And All Power Plant Auxiliaries

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New York City, Hudson Terminal Bldg.

Los Angeles, I. N. Van Nuys Bldg. Seattle, L. C. Smith Bldg.
Salt Lake City, 705-6 Kearns Bldg. Tucson, 21 South Stone Ave.
Honolulu, T. H.

Manufactured by

CLIFTON MANUFACTURING CO.
65 Brookside Ave.
BOSTON, 30, MASS.

CLAPP & LA MOREE
SELLING AGENTS
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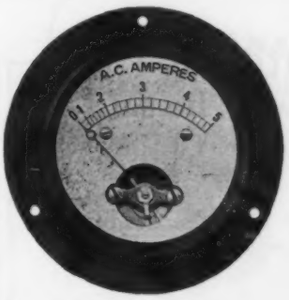

Satisfaction is not always dependent on a large expenditure

Roller-Smith Type TIA (2⅝″) and Type FIA (4″) A.C. ammeters, voltmeters and wattmeters are low in price but they are well made little instruments, accurate, well damped and, **above all,** reliable. Ranges up to 50 amperes, 2500 volts and 7.5 K.W.

Send for Bulletin No. H-420. It shows the complete line.

Roller-Smith Company
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NEW YORK

Works:
Bethlehem, Pa.

Offices in Principal Cities in U. S. and Canada

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Magnet Wire and Windings

represent the highest developments in the manufacture of magnet wire and the winding of coils.

Starting with the copper rod all operations from the breaking of the rod to the final inspection of the finished wire or coil are performed in our own plant under the supervision of a corps of specialized engineers and inspectors.

This control of quality eliminates the guess work and enables us to place our unqualified guarantee on all Dudlo Products.

WIRE

Bare, Tinned, Enameled, Single Cotton Enameled, Single Silk Enameled, Single Cotton Covered, Double Cotton Covered, Single Silk Covered, Double Silk Covered, Litzendraht, Braided Terminals, also Fractional Pound Packages for retail sale.

WINDINGS

Coils wound for every purpose in strict accordance with our customers' specifications which are held in absolute confidence.

Let us demonstrate our ability to satisfy you. Refer your requirements to our nearest representative listed below.

DUDLO

Dudlo Manufacturing Company, Fort Wayne, Indiana

Western Representatives:

A. S. Lindstrom, 111 New Montgomery St., San Francisco, Calif.

H. A. Killam, 312 McKay Bldg., Portland, Ore.

G. H. Maire, 95 Connecticut St., Seattle, Wash.

Electric Sales Co., 1144 Maple Ave., Los Angeles, Calif.

Strength

is first and foremost of all considerations entering into the construction of

'UNION'
RENEWABLE FUSES

No other fuse is built so ruggedly. No other can be renewed so quickly. That explains why no other fuse withstands so many blowouts and why the

"UNION" Saves More than ANY Other Renewable Fuse

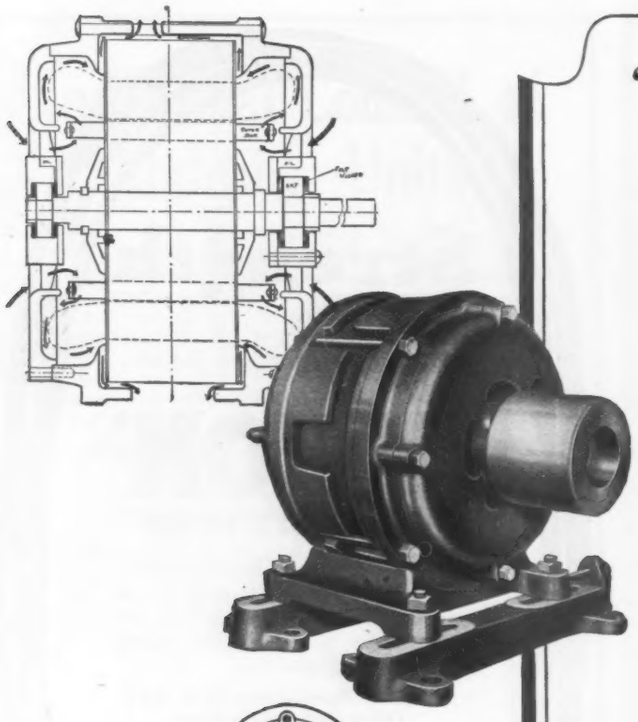
At Leading Dealers and Jobbers

Write for Catalog

CHICAGO FUSE MFG. COMPANY

Illinois Electric Co., Los Angeles; Electric Appliance Co., and Dunham, Carrigan & Hayden Co., San Francisco; Fobes Supply Co., Portland, Seattle, San Francisco and Oakland.

CHICAGO
NEW YORK



"Best Ventilated..." —and why he said it

That's what the manager of a big motor repair shop said about Valley Motors.

This ventilation is gained by the extension of the copper rotor bars on both sides of the rotor. Air is drawn into the motor through the end plates by the extended rotor bars which act as fans. The cooling air currents are forced over the winding and stator laminations and driven out through vents in the frame.

Good ventilation means low temperature rise. And low temperature rise in a motor prolongs its life.

Valley polyphase motors are made in sizes from ¼ to 40 h. p. Valley single phase motors are made in sizes from ⅛ to 5 h. p.

Write for Bulletin No. 8. It describes all details of Valley design and construction.

Valley Electric Company

3157 S. Kingshighway, St. Louis, Mo.

Valley Motors

Sepco electric water heaters are installed in 31 of these Columbus homes

The Sepco Measured Service Electric Water Heater

Practically all of the new homes being built today, large or small, are electrically equipped, and in most cases with the Sepco Electric Water Heater.

The Columbus installation featured above is but one of many similar building programs where Sepco Heaters are being installed. Every modern home demands a fool proof water heating service, one that insures a constant, ever ready supply of hot water at the turn of the faucet, and this is best obtained by installing the Sepco Electric Water Heater.

Manufactured by

AUTOMATIC ELECTRIC HEATER COMPANY

Warren, Penna.

Sales Offices:

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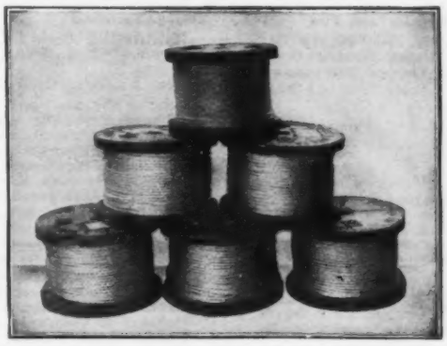
BOSTON, MASS.
88 Broad St.

SAN FRANCISCO, CAL.
63 Second St.

"INDIANA"
Galvanized Steel Strand



Standard or Commercial Grade, Single and Double Galvanized.

Siemens-Martin, High Strength and Extra High Strength grades, all Double Galvanized. 2-ply and 3-ply Wire for Special Purposes.

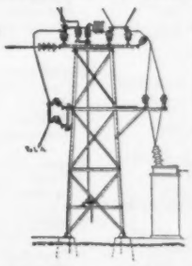
"INDIANA"
Double Galvanized Telephone and Telegraph Wire

We make this wire in three grades—E. B. B. B. B. and Steel.

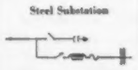
Indiana Steel & Wire Company
Muncie, - - Indiana

The Line that R. and I. E. Co. Builds!

This is the



Steel Substation



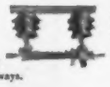
Send us a single line diagram and let us work out your problem on the

Interchangeable Unit Plan

That supports the

Combination Horn Gap Switch, Cylindrical Choke Coil and Horn Gap Fuse, Type IB-CB-F.
One of the many listed in our Bulletin 1709.

and the



Disconnecting Switch with the self-aligning jaw Full surface. Contact Always.

and the

Bus Supports
Upright, Inverted and Vertical Mountings. A complete assortment of bus clamps and fittings.

That makes up the Interchangeable Unit Substation that R. and I. E. Co. Builds

R. & I. E. Interchangeable Insulator Unit Equipment for outdoor service includes Bus Supports, Disconnecting Switches, Air Break Horn Gap Switches, Choke Coils, Fuse Holders, Lightning Arresters, Substation Combinations and Outdoor Steel Substations.

Manufactured by
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H. B. Squires Co.

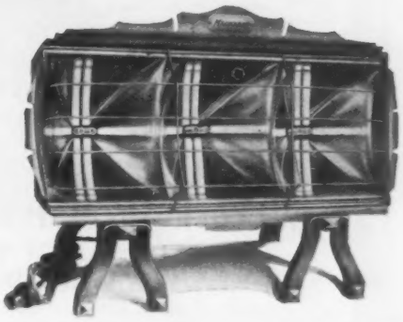
Seattle
H. B. Squires Co.

Los Angeles
Engineering & General Supply Co.

9

heats ALL the room
MAGNARAY

new portable electric HEATER



880 watt 3-cell Magnaray, Type H-3 shown at right. Also made in 2-cell 660 watt, Type H-2. End view sketch above shows portable feature.

Every man interested in the use or sale of electrical apparatus will want a copy of the interesting booklet describing marvelous new MAGNARAY. Send for your copy today.

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Deliveries are Right
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Factory: WALLINGFORD, CONN.

Western Representatives:
ILLINOIS ELECTRIC CO., Los Angeles, Cal.

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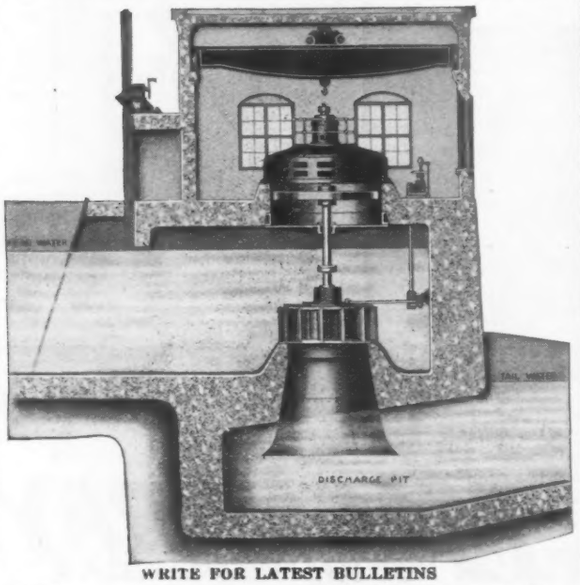

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Chance Co.
Hubbard & Company
Pacific States Electric Company
Western Electric Company

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Chicago Flexible Shaft Co.
Edison Electric Appliance Co.
Federal Electric Co.
Galvin Electric Mfg. Co.
Geier Company, The P. A.
Haag Bros. Co.
Horton Mfg. Co.
Hurley Machine Company
Magee Furnace Co.
Majestic Electric Appliance Co.
Meadows Mfg. Co.
Pacific States Electric Co.
Reiman Wholesale Elec. Co.
Roper Corporation, Geo. D.
Rutenber Electric Co.
Savage Arms Corpn.
Shelton Electric Co.
Simplex Electric Heating Co.
Wells-Morris Mfg. Co.
Western Electric Company

Arms, Cross
Baker-Joslyn Company
Benjamin Electric Mfg. Co.
Hubbard & Company
Pacific States Electric Company
Western Electric Company

Arresters, Lightning
Electrical Engineers Equip. Co.
General Electric Company
Hubbard & Company
Pacific States Electric Company
Schweitzer & Conrad, Inc.
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Benjamin Electric Mfg. Company
Cutler-Hammer Mfg. Co.
Harvey Hubbell, Inc.
National Metal Molding Co.
Roller-Smith Company

Ball Bearings
Norma Co .of America
S K F Industries of California

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Pacific States Electric Company
Western Electric Company

Battery Charging Apparatus
Cutler-Hammer Mfg. Co
General Electric Company
Pacific States Electric Company
Wagner Electric Corporation
Western Electric Company
Westinghouse Electric & Mfg. Co.

Bells, Electric
Pacific States Electric Company
Western Electric Company

Belts, Linemen's Safety
Baker-Joslyn Company
Buhrke Co., R. H.
Pacific States Electric Company

Blowers
Pacific States Electric Company

Boilers, Steam
Moore & Company, Chas. C.

Bolts, Expansion and Galvanized
Baker-Joslyn Company
Pacific States Electric Company
Western Electric Company

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Technical Book Shop

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Johns-Pratt Company, The
Pacific States Electric Company
Reiman Wholesale Elec. Co.
Standard Underground Cable Co.
Trumbull Electric Mfg. Co.
V.V. Fittings Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Hubbard & Company
Pacific States Electric Company
Western Electric Company

Brackets, Pole and Wall
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Hubbard & Company
Locke Insulator Corp.
National Metal Molding Company
Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.

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American Copper Products Corp.
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Elec. Power Equipment Corp.
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Standard Underground Cable Co.
Western Electric Company
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Reiman Wholesale Elec. Co.
Western Electric Company
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Condit Electrical Mfg. Co.
General Electric Company
Pacific States Electric Company
Roller-Smith Company
Schweitzer & Conrad, Inc.
Trumbull Electric Mfg. Co.
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Western Electric Company
Westinghouse Electric & Mfg. Co.

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Electrical Engineers Equip. Co.
Hubbard & Company
Locke Insulator Corp.
Memco Eng & Mfg. Co.
Pacific States Electric Company
States Company, The
Thomas & Sons Company, R.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Cleats, Porcelain
Baker-Joslyn Company
Pacific States Electric Company
Thomas & Sons Company, R.
Western Electric Company

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Pacific States Electric Company
Western Electric Company

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Benjamin Electric Mfg. Co.
Pacific States Electric Company
Western Electric Company

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General Electric Company
Pacific States Electric Company
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States Company, The
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Baker-Joslyn Company
Okonite Company, The
Pacific States Electric Company
Standard Underground Cable Co.
V.V. Fittings Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Condensers, Steam
Allis-Chalmers Mfg. Company
Moore & Company, Chas. C.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Conductors, Armored
Baker-Joslyn Company
National Metal Molding Co.
Pacific States Electric Company

Conduit
American Wiremold Co.
Baker-Joslyn Company
Clifton Mfg. Co.
General Electric Company
National Metal Molding Co.
Pacific States Electric Company
Tubular Woven Fabric Co.
Western Electric Company

Conduit Boxes & Fixture Switches
McGill Mfg. Co.

Conduit Fittings
American Wiremold Co.
Baker-Joslyn Company
Chicago Fuse Mfg. Co.
General Electric Company
National Metal Molding Co.
Pacific States Electric Company
Reiman Wholesale Elec. Co.
V.V. Fittings Company
Western Electric Company

Connectors
Pacific States Electric Company
Sherman Mfg. Company, H. B.
States Company, The
Westinghouse Electric & Mfg. Co.

Contactors, A.C. and D.C.
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Electric Controller & Mfg. Co.
General Electric Company
Industrial Controller Co.
Westinghouse Electric & Mfg. Co.

Controllers, Motor
Cutler-Hammer Mfg. Co.
Electric Controller & Mfg. Co.
General Electric Company
Industrial Controller Co.
Wagner Electric Corporation
Western Electric Company
Westinghouse Electric & Mfg. Co.

Converters
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Wagner Electric Corporation
Westinghouse Electric & Mfg. Co.

Cord
Baker-Joslyn Company
Okonite Company, The
Pacific States Electric Company
Rockbestos Products Corp.
Simplex Wire & Cable Co.
Tubular Woven Fabric Co.
Western Electric Company

Cut-outs
Chicago Fuse Mfg. Company
D & W Fuse Works of G. E. Co.
Harvey Hubbell, Inc.
Johns-Pratt Company, The
Pacific States Electric Company
Schweitzer & Conrad, Inc.
Ward Leonard Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Dimmers, Theater
Cutler-Hammer Mfg. Co.
General Electric Company
Ward Leonard Electric Company

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Allis-Chalmers Mfg. Company
General Electric Company
Ridgway Dynamo & Engine Co.
Wagner Electric Corporation
Westinghouse Electric & Mfg. Co.

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Stone & Webster, Inc.

Engines, Gas and Steam
Allis-Chalmers Mfg. Company
Moore & Company, Chas. C.
Westinghouse Electric & Mfg. Co.

Fans, Portable, Ceiling
General Electric Company
Pacific States Electric Company
Robbins & Myers Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Fans, Exhaust
Allis-Chalmers Mfg. Company
General Electric Company
Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Fault Finders, Electric
Electric Controller & Mfg. Co.
Roller-Smith Company
Westinghouse Electric & Mfg. Co.

Fibre
Pacific States Electric Company
Westinghouse Electric & Mfg. Co.

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Benjamin Electric Mfg. Co.
Duplex Lighting Works
Harvey Hubbell, Inc.
National Metal Molding Co.
National X-Ray Reflector Co.
Pacific States Electric Company
Pass & Seymour
Sherman Mfg. Company, H. B.
V.V. Fittings Company
Western Electric Company

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Pacific States Electric Company
Trumbull Electric Mfg. Co.
Western Electric Company

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General Electric Company
National X-Ray Reflector Co.
Westinghouse Electric & Mfg. Co.

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Baker-Joslyn Company
Chicago Fuse Mfg. Co.
D & W Fuse Works of G. E. Co.
Federal Electric Company
Johns-Pratt Company, The
Pacific States Electric Company
Schweitzer & Conrad, Inc.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Gloves, Electrician's Rubber
Aetna Rubber Co.

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Allis-Chalmers Mfg. Company
General Electric Company
Pelton Water Wheel Co.

Guards, Lamp
Benjamin Electric Mfg. Co.
Harvey Hubbell, Inc.
McGill Manufacturing Co.
Pacific States Electric Company
Western Electric Company

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Baker-Joslyn Company
Hubbard & Company
Pacific States Electric Company
Standard Underground Cable Co.
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Western Electric Company
Westinghouse Electric & Mfg. Co.

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Strait & Richards, Inc.

Heating Elements
Wiegand Co., Edwin L.

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Cutler-Hammer Mfg. Co.
Edison Electric Appliance Co.
General Electric Company
Hicks, W. Wesley
Magee Furnace Co.
Magnavox Company
Majestic Electric Appliance Co.
Pacific States Electric Company
Reiman Wholesale Elec. Co.
Strait & Richards, Inc.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Hoists, Electric
General Electric Company
Moore & Company, Chas. C.

Hoods, Street
Benjamin Electric Mfg. Co.
Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Cory & Son, Inc., Chas.

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Pacific States Electric Company
Roller-Smith Company
Sangamo Electric Co.
Schweitzer & Conrad, Inc.
States Company, The
Western Electric Company
Weston Electric Instrument Co.

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Jeffery-Dewitt Insulator Co.
Lapp Insulator Co., The
Locke Insulator Corp.
Pacific States Electric Company
The Ohio Brass Company
Thomas & Sons Company, R.
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Cutler-Hammer Mfg. Co.
D & W Fuse Works of G. E. Co.
Delta-Star Electric Co.
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Pacific States Electric Company
Standard Underground Cable Co.
Westinghouse Electric & Mfg. Co.

Lamp Frostings
McKay Company

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Edison Lamp Works
Mazda Service of G. E. Co.
National Lamp Works
Pacific States Electric Company
Reiman Wholesale Elec. Co.
Western Electric Company
Westinghouse Lamp Company

Lamp Standards
Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Myers Electric Supply Co.
Western Electric Company
Westinghouse Electric & Mfg. Co.

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General Electric Company
Railway and Industrial Engr. Co.
Westinghouse Electric & Mfg. Co.

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General Electric Company
Hubbard & Company
Locke Insulator Corp.
Pacific States Electric Company
The Ohio Brass Company
Thomas & Sons Company, R.
Western Electric Company
Westinghouse Electric & Mfg. Co.

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National Metal Molding Co.
Pacific States Electric Company

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Allis-Chalmers Mfg. Company
General Electric Company

Magnets, Lifting
Cutler-Hammer Mfg. Co.
Electric Controller & Mfg. Co.
Ohio Electric & Controller Co.

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Benjamin Electric Mfg. Co.
General Electric Company
Westinghouse Electric & Mfg. Co.

Meters
Duncan Electric Mfg. Co.
General Electric Company
Jewell Elec. Instrument Co.
Roller-Smith Company
Sangamo Electric Co.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Meter Testers
Johns-Pratt Company, The
Roller-Smith Company
States Company, The

Molding, Metal, Wood
American Wiremold Co.
National Metal Molding Co.
Pacific States Electric Company
Western Electric Company

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Electric Controller & Mfg. Co.
Fairbanks, Morse & Co.
General Electric Company
Ohio Electric & Controller Co.
Robbins & Myers Company
Valley Electric Co.
Wagner Electric Corporation
Western Electric Company
Westinghouse Electric & Mfg. Co.

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General Electric Company
Ridgway Dynamo & Engine Co.
Wagner Electric Corporation
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Condit Electrical Mfg. Co.
Cutler-Hammer Mfg. Co.
Electric Controller & Mfg. Co.
General Electric Company
Industrial Controller Co.
Pacific States Electric Company
Trumbull Electric Mfg. Co.
Wagner Electric Corporation
Ward Leonard Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Moore & Company, Chas. C.

Oil Fuse Cutouts, Aerial and Underground
D & W Fuse Works of G. E. Co.

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National Metal Molding Co.

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Pacific States Electric Company
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Cutler-Hammer Mfg. Co.
General Electric Company
Pacific States Electric Company
Ward Leonard Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Hubbard & Company
Locke Insulator Corp.
Pacific States Electric Company
Thomas & Sons Company, R.
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Kellogg Company, The M. W.
National Tube Co.

Plates, Flush Switch
Pacific States Electric Company
Western Electric Company

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Bard-Parker Co., Inc.
Rubber Insulated Metals Corp.

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Ajax Electric Specialty Co.
Benjamin Electric Mfg. Co.
Bryant Electric Co.
Connecticut Elec. Mfg. Co.
Cutler-Hammer Mfg. Co.
Hart & Hegeman Mfg. Co.
Harvey Hubbell, Inc.
McGill Manufacturing Co.
National X-Ray Reflector Co.
Pacific States Electric Company
Pass & Seymour
V.V. Fittings Company
Western Electric Company

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Bates Expanded Steel Truss Co.
Pacific Coast Steel Co.
Pacific States Electric Company
Western Electric Company

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Baker-Joslyn Company
Locke Insulator Corp.
Thomas & Sons Company, R.

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G & W Electric Specialty Co.
Standard Underground Cable Co.
Westinghouse Electric & Mfg. Co.

Power Plants
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General Electric Company
Moore & Company, Chas. C.
Westinghouse Electric & Mfg. Co.

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Neal, Stratford & Kerr

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General Electric Company
National X-Ray Reflector Co.
Westinghouse Electric & Mfg. Co.

Protective Devices
Condit Electrical Mfg. Co.
Roller-Smith Company

Pumps
Moore & Company, Chas. C.
Pelton Water Wheel Co.
Westinghouse Electric & Mfg. Co.
Worthington Pump & Machy.Corp.

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Electric Controller & Mfg. Co.
Harvey Hubbell, Inc.
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Western Electric Company

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Reiman Wholesale Electric Co.
Simplex Electric Heating Co.

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Roller-Smith Company

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Westinghouse Electric & Mfg. Co.

Rectifiers
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Westinghouse Electric & Mfg. Co.

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Duplex Lighting Works
Harvey Hubbell, Inc.
National X-Ray Reflector Co.
Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Regulators, Voltage
General Electric Company
Ward Leonard Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Condit Electrical Mfg. Co.
Electric Controller & Mfg. Co.
General Electric Company
Roller-Smith Company
Westinghouse Electric & Mfg. Co.

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Electric Controller & Mfg. Co.
General Electric Company
Ward Leonard Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Cutler-Hammer Mfg. Co.
Electric Controller & Mfg. Co.
General Electric Company
Pacific States Electric Company
Ward Leonard Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Rosettes
General Electric Company
Harvey Hubbell, Inc.
Pass & Seymour

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Rubber Insulated Metals Corp.

Searchlights
General Electric Company
Pacific States Electric Company

Sockets, Pull
Harvey Hubbell, Inc.

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Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Solenoids
Electric Controller & Mfg. Co.
Westinghouse Electric & Mfg. Co.

Stationery
Neal, Stratford & Kerr

Steel, Structural & Reinforcing
Pacific Coast Steel Co.

Street Lighting
General Electric Company
Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

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Bard-Parker Co., Inc.

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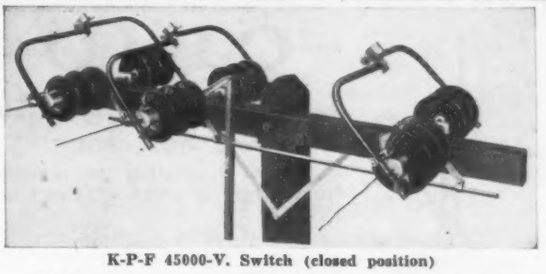

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336 Axuza St.

WHERE TO BUY

CLASSIFIED INDEX TO ADVERTISERS

Sub-stations
Delta-Star Electric Co.
Electrical Engineers Equip. Co.
Railway and Industrial Engr. Co.
Schweitzer & Conrad, Inc.
Westinghouse Electric & Mfg. Co.

Subway Boxes
Johns-Pratt Company, The

Switchboards
Allis-Chalmers Mfg. Co.
Baker-Joslyn Company
Condit Electrical Mfg. Co.
Elec. Power Equipment Corp.
General Electric Company
Pacific States Electric Company
Trumbull Electric Mfg. Co.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Switches, High Tension
Allis-Chalmers Mfg. Company
Condit Electrical Mfg. Co.
Delta-Star Electric Co.
Electrical Engineers Equip. Co.
Elec. Power Equipment Corp.
General Electric Company
K-P-F Electric Co.
Railway and Industrial Engr. Co.
Schweitzer & Conrad, Inc.
Trumbull-Vanderpoel Elec. Mfg. Co.
Westinghouse Electric & Mfg. Co.

Switches, House Service
Baker-Joslyn Company
Benjamin Electric Mfg. Co.
Condit Electrical Mfg. Co.
Connecticut Elec. Mfg. Co.
Cutler-Hammer Mfg. Co.
Elec. Power Equipment Corp.
General Electric Company
Harvey Hubbell, Inc.
Manhattan Elec. Supply Co.
Pacific States Electric Company
Reiman Wholesale Elec. Co.
Trumbull-Vanderpoel Elec. Mfg. Co.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Switches, Motor Controlling
Condit Electrical Mfg. Co.
Cutler-Hammer Mfg. Co.
Electric Controller & Mfg. Co.
Elec. Power Equipment Corp.
General Electric Company
Industrial Controller Co.
Johns-Pratt Company, The
Pacific States Electric Company
Schweitzer & Conrad, Inc.
Trumbull Electric Mfg. Co.
Trumbull-Vanderpoel Elec. Mfg. Co.
Western Electric Company
Westinghouse Electric & Mfg. Co.

Tape, Friction, Rubber
Appleton Rubber Co.
Baker-Joslyn Company
Clifton Mfg. Co.
General Electric Co.
New York Insulated Wire Co.
Okonite Company, The
Pacific States Electric Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Telephone Equipment
Pacific States Electric Company
Western Electric Company

Terminals
States Company, The

Tools, Construction
Baker-Joslyn Company
Hubbard & Company
Oshkosh Mfg. Co.
Pacific States Electric Company
Western Electric Company

Toys, Electric
Lionel Corp., The

Towers, Steel
Bates Expanded Steel Truss Co.
Blaw-Knox Company
Pacific Coast Steel Co.

Transformers
Allis-Chalmers Mfg. Company
Duncan Electric Mfg. Co.
General Electric Company
Pacific States Electric Company
Packard Electric Co., The
States Company, The
Wagner Electric Corporation
Western Electric Company
Westinghouse Electric & Mfg. Co.

Trolley Line Material
Baker-Joslyn Company
General Electric Company
Pacific States Electric Company
The Ohio Brass Company
Western Electric Company
Westinghouse Electric & Mfg. Co.

Turbines, Hydraulic, Water Wheels
Allis-Chalmers Mfg. Company
Cramp & Sons Co., The Wm.
Leffel & Co., The James
Pelton Water Wheel Co.
Smith Company, S. Morgan
Worthington Pump & Machy. Corp.

Turbines, Steam
Allis-Chalmers Mfg. Company
General Electric Company
Ridgway Dynamo & Engine Co.
Westinghouse Electric & Mfg. Co.

Vibrators
Shelton Electric Co.

Water Heaters
Hicks, W. Wesley
Washington Electric Supply Co.

Welding Apparatus, Electric
General Electric Company
Pacific States Electric Company
The Ohio Brass Company
Western Electric Company

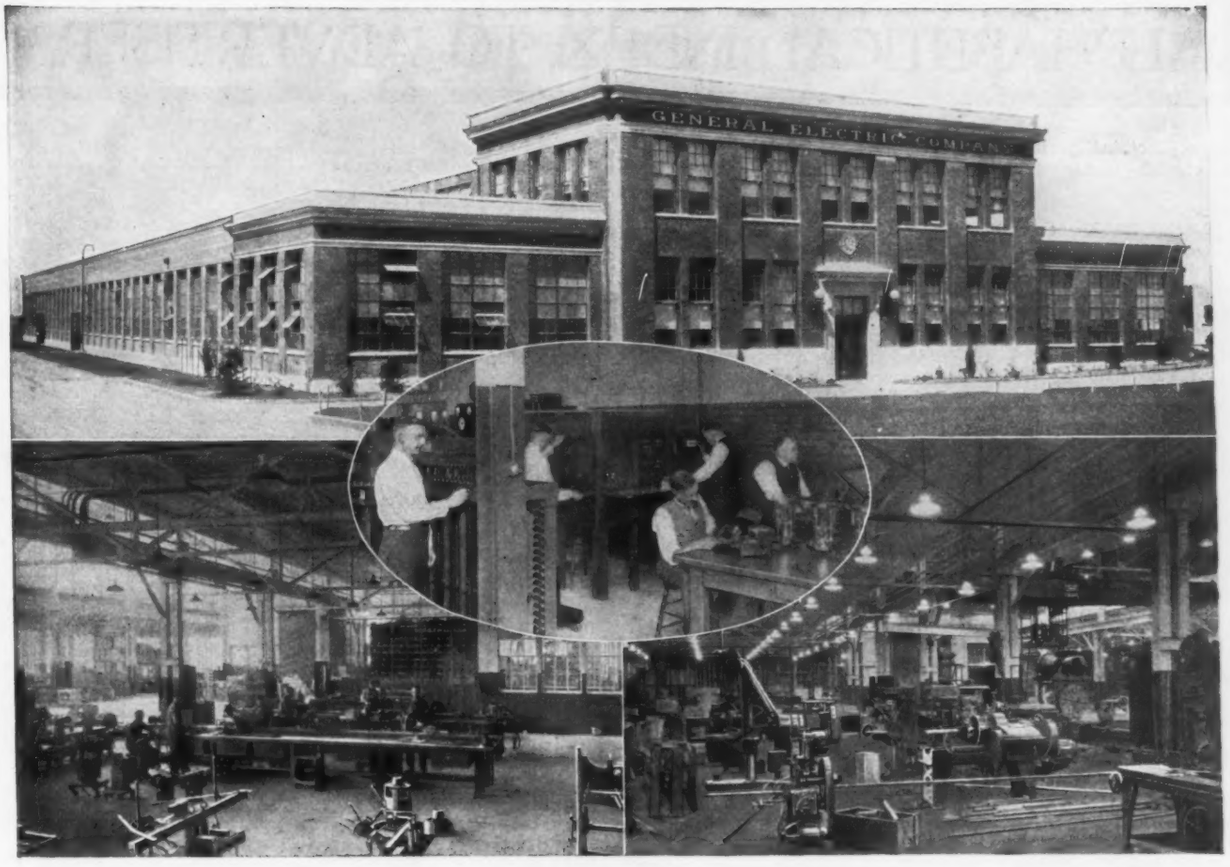
Windings
Dudlo Manufacturing Co.
Shelton Electric Co.

Wire, Galvanized Steel
American Copper Products Corp.
American Ins. Wire & Cable Co.
Baker-Joslyn Company
Pacific States Electric Company
Phillips Wire Co.
Rockbestos Products Corp.
Roebling's Sons Co.
Rome Wire Co.
Simplex Wire & Cable Co.
Standard Underground Cable Co.
Western Electric Company

Wire, Bare and Insulated Copper
American Ins. Wire & Cable Co.
Anaconda Copper Mining Co.
Baker-Joslyn Company
California Wire Co.
Dudlo Manufacturing Co.
Indiana Rubber & Insul. Wire Co.
Indiana Steel & Wire Co.
National Metal Molding Co.
New York Insulated Wire Co.
Okonite Company, The
Pacific States Electric Company
Peerless Ins. Wire & Cable Co.
Phillips Wire Co.
Reiman Wholesale Elec. Co.
Rockbestos Products Corp.
Roebling's Sons Co.
Rome Wire Co.
Simplex Wire & Cable Co.
Standard Underground Cable Co.
Western Electric Company

Wiring Devices
Connecticut Elec. Mfg. Co.
Harvey Hubbell, Inc.
Myers Electric Supply Co.
Pacific States Electric Company

For a cross-indexed list of manufacturers and their Western Representatives, published semi-annually, see issue of Oct. 15, 1923 for last edition.



Service for the Pacific Coast

The first of the G-E buildings to be erected on the Company's 24 acre plot in Oakland provides space for:

The manufacture of switchboards
The manufacture of distribution transformers
An instrument laboratory
A local service shop

Switchboards have been built by us on the Coast for thirteen years during which time we have supplied some of the most prominent installations. Switchboard devices can be furnished from stock and the facilities for repair service are exceptionally complete.

The new factory means added ability to serve Pacific Coast customers promptly and efficiently.

General Electric Company
Schenectady, N. Y.
Pacific Coast Sales Offices
San Francisco — Los Angeles
Portland — Seattle
Spokane — Tacoma
Rocky Mountain Sales Offices
Denver, Colorado
Salt Lake City, Utah

95-784

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NO. 33 PLURAL SOCKET PLUG

AJAX—St. Louis

Three Socket Plugs Are Wanted At Right Price, Right Design and Highest Quality—"AJAX"—No. 33 Are the Goods.

No. 22—Each ... .75c
2-4-1 — " ... .65c

Liberal Discounts F.O.B. Any Jobbing City in the U. S.

Order Direct or Thru Your Jobber.

Write for Price Sheets—Electrical and Radio Specialties.

Each $1.00

Original Patented Design

AJAX ELECTRIC SPECIALTY CO.
1926 Chestnut —— St. Louis

Distributor for Southern California
R. P. Tillotson & Co.,
229 S. San Pedro St.,
Los Angeles, Calif.

Distributor for Northern California
J. R. O'Donnell & Co.,
171 Second St.,
San Francisco, Calif.

Announcing the Electrically Operated G-E Flow Meter

For measuring steam, air, gas, water, oil, etc.

JUST as *flexibility* has always been the outstanding advantage of the electric motor—operating remote from its source of power—the electric flow meter has a definite field.

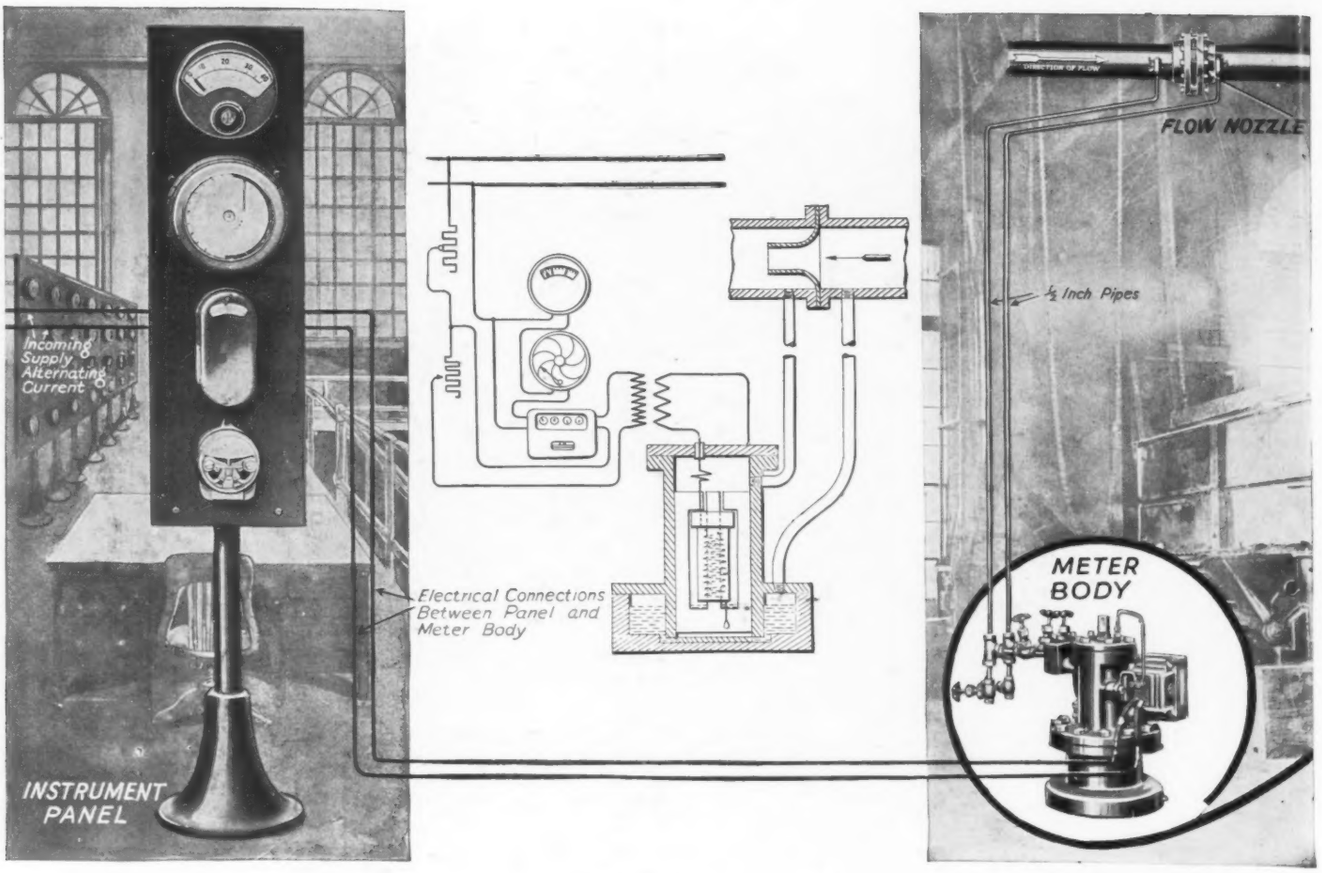
Recognizing that it is often desirable to have readings or records of flow at a considerable distance from where the flow is measured, the General Electric Company is pleased to introduce an electric flow meter, in addition to its well-known line of mechanical meters.

The intensive work of the G-E Engineering Departments, backed by years of experience in the application of G-E Flow Meters, is well repaid. The new G-E Electrically Operated Flow Meter is founded on a principle of design differing from all others and so simple, so reliable, so basically correct, that superior operation is assured.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

34C-68

GENERAL ELECTRIC



The Electrically Operated G-E Flow Meter

This new flow meter consists of three principal elements—the flow nozzle, the meter body and the electrical measuring instruments and voltage regulator mounted on the panel.

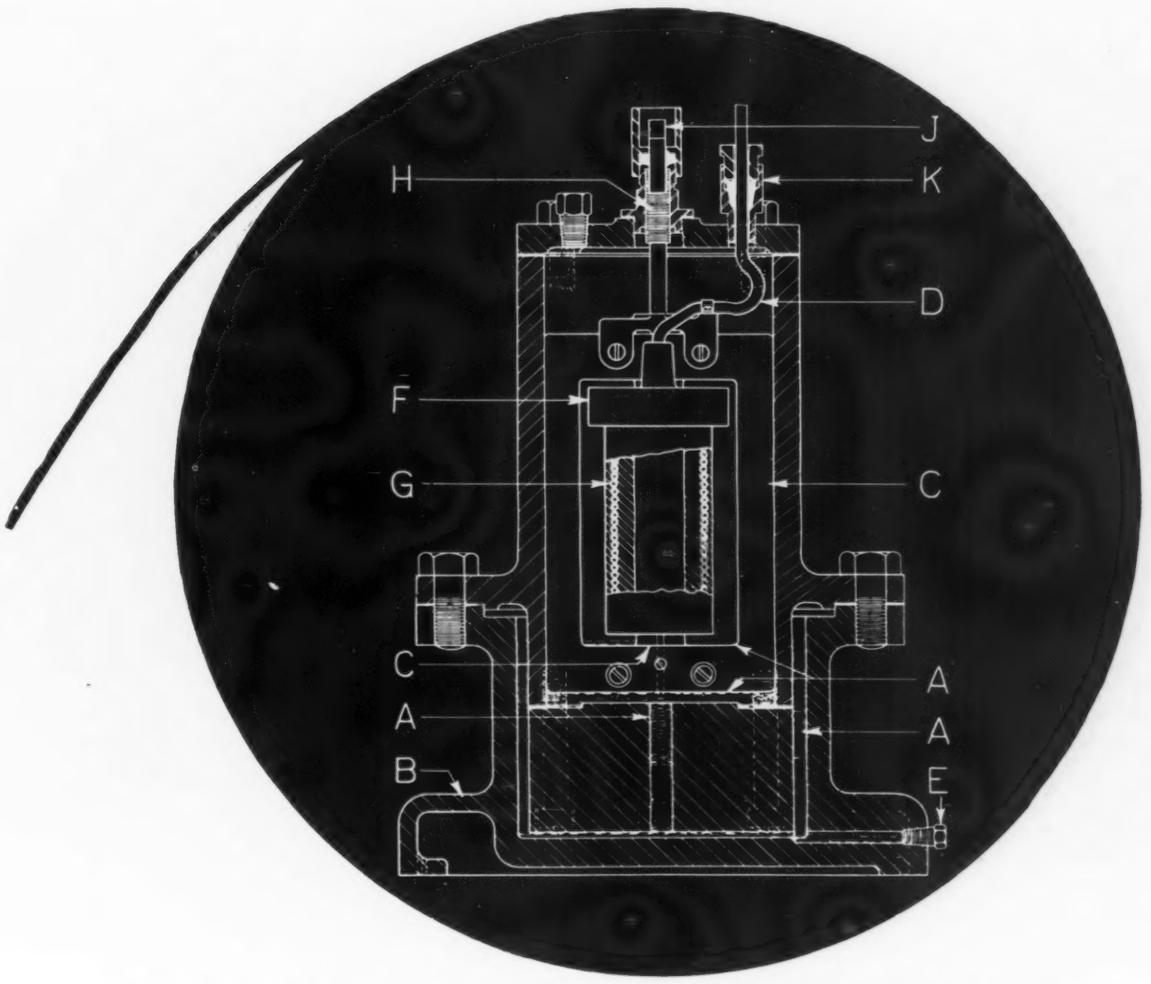
The meter body contains mercury and a transformer, and is so made as to form a U-tube, the base or mercury well forming one leg and the transformer chamber the other.

A pressure of less than 5 volts (eliminating possibility of grounding) is applied to the primary coil of the transformer inside the meter body from the secondary of a small transformer attached to the outside of the meter body. The measuring instruments are in the primary circuit of the external transformer. The voltage of this circuit is held at 108 volts by the voltage regulator.

A differential pressure produced by the flow nozzle causes the mercury in the meter body to rise around the primary coil of the internal transformer, forming a one-turn mercury secondary. As this mercury ring increases in height, more and more current is induced in it, supplied through the primary circuit, and measured by the electrical instruments.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

GENERAL



(A)—Mercury, which forms the secondary of the internal transformer.

(B)—Cast iron base.

(C)—Laminations of internal transformer.

(D)—Flexible rubber-covered lead to primary coil.

(E)—Mercury drain plug.

(F)—Insulating compound covering primary coil of internal transformer.

(G)—Primary coil to which 5 volts is applied from external transformer (not shown).

(H)—Screw for raising or lowering internal transformer in meter body to get zero-flow adjustment.

(J)—Squared stem fitting key for turning screw H.

Some of the Superior Features

This flow meter operates on the transformer principle, which permits the most simple and reliable design both mechanically and electrically. The transformer secondary is simply a mercury ring. No oil is required for insulation.

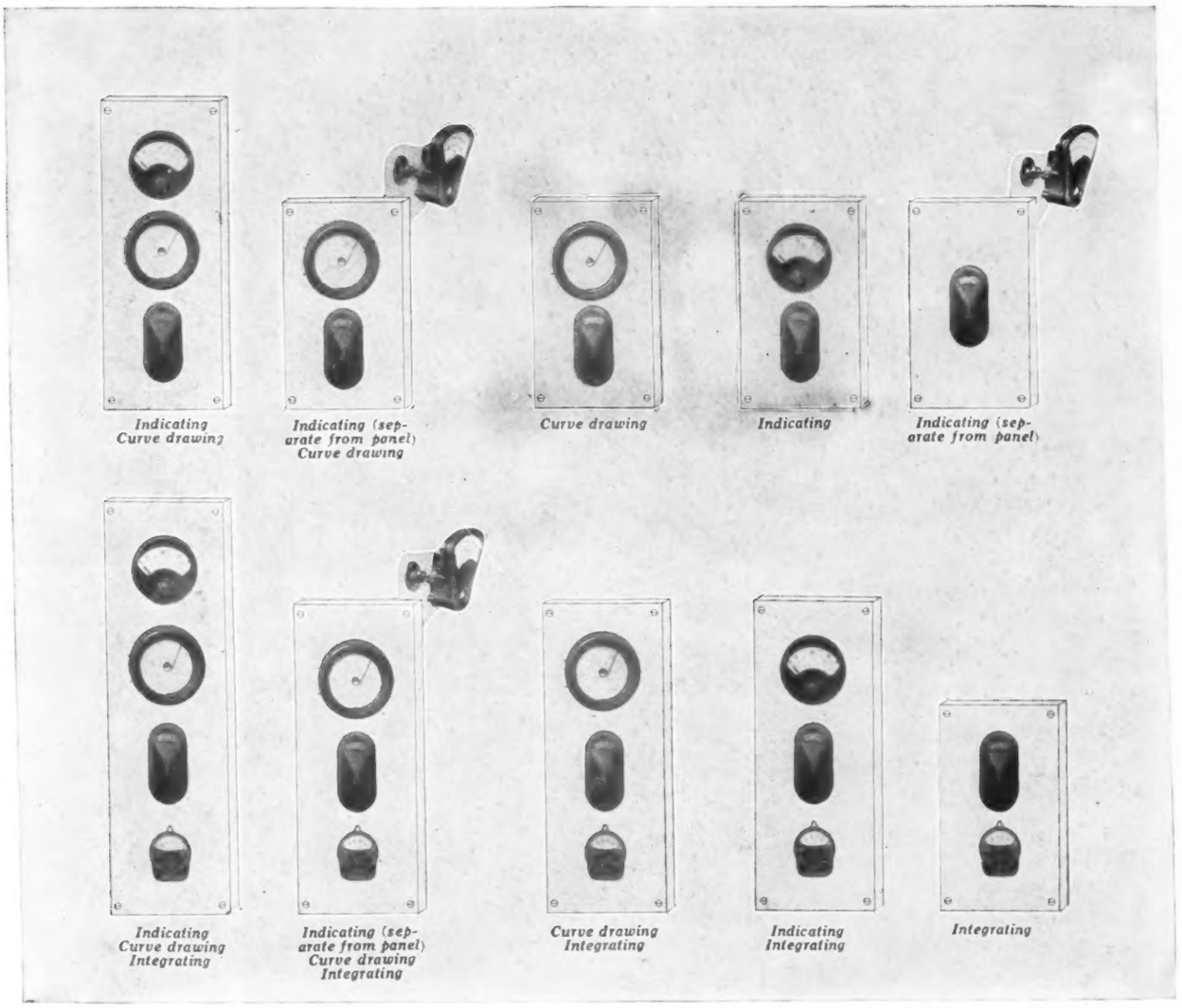
The inevitable accumulation of dirt, mercury oxide, pipe scale, pipe dope, iron oxide, boiler compound, etc., upon the surface of the mercury, has no effect on its operation.

To insure accuracy a voltage regulator is installed on each panel to hold a constant voltage.

Essential to the accuracy and reliability of any flow meter is a good integrating device. The integrator in the G-E Electrically Operated Flow Meter is the well-known I-14 Watthour Meter, which has no superior for accuracy in service.

34C-69

ELECTRIC



Make G-E Electrical Instruments Your Flow Meters

Integrating Flow Meter—type I-14 watthour meter. Several million are in daily use.

Curve Drawing Flow Meter—type CR-2 ammeter, furnished with spring-driven or Warren synchronous motor electric Clock.

Indicating Flow Meter—type R-4, round-pattern ammeter, which can be mounted on the panel or separate from the panel on an adjustable bracket.

Indicating Flow Meter—type DI-3 ammeter mounted separate from the panel on an adjustable bracket. This instrument is equipped with a very large indicating scale, figures and pointer, and can be read from a considerable distance.

A type T-A, form R, Voltage Regulator holds constant voltage on the flow meter circuit.

Instrument panels are enameled steel, ordinarily furnished with pedestal mounting, but pipe-work supports can be supplied.

General Electric Company
Schenectady, N. Y.
Sales Offices in All Large Cities

34C-70

GENERAL ELECTRIC

FOR COLD WEATHER SALES

Simplex
ELECTRIC HEATING PAD

The money most families spend on hot water bottles, liniments, "rubs", and warming salves in the course of a winter would more than buy a Simplex Electric Heating Pad.

Why let your neighbor, the druggist, have all of this business? A reminder to your customers—a little extra selling effort now and then—will play a joyful tune on your cash register.

3-Color Display Stand Sent Free With Your Order For Six Pads

This attractive display stand is made of hard wood with a hand-rubbed mahogany finish. It holds one Simplex Pad at the proper angle to catch the customer's eye. Packed, knocked down in a substantial box and easy to put together. The brilliant sign is 12" x 4½"

SIMPLEX ELECTRIC HEATING COMPANY

85 Sidney Street, Cambridge, Mass.

120 West 32nd Street
New York

15 So. Desplaines Street
Chicago, Ill.

BATES POLES ON TRANSMISSION SERVICE AT GARY IND.

The Gary Heat, Light and Water Company at Gary, Indiana, used Bates Poles on their transmission service line through the City of Gary.

This line was installed in 1917. "No poles have been lost," and, "we have had no trouble with this line since installation," sums up the service Bates Poles have given to date!

Bates Poles outlive the bond issues that buy them!

BEST Bates Expanded Steel Truss Co.
Illinois Merchants Bank Bldg.
Chicago, Ill., U. S. A.

ONE PIECE
EXPANDED
STEEL POLES